

# MOTOR AGE

Vol. XXVIII  
No. 4

CHICAGO, JULY 22, 1915

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Demand a Polish  
That Withstands  
Dust, Sun, Rain, Mud



This Shaw Taxi Has Traveled Nearly 100,000 Miles,  
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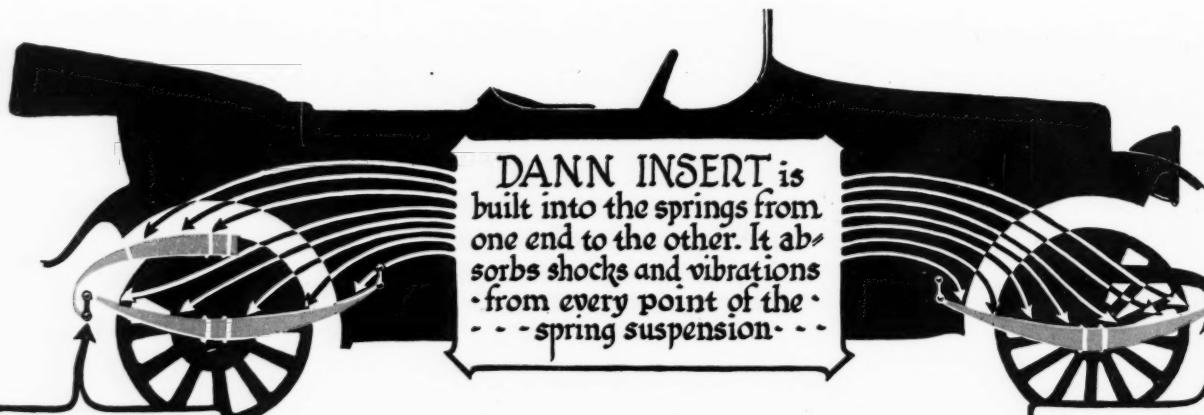
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My Accessory Dealer Is .....



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Ordinary Shock Absorbers Do Not Provide Means For This End of the Car

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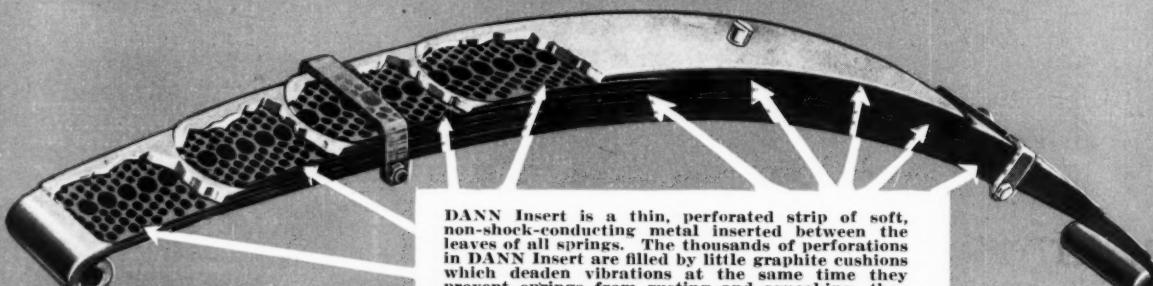
One might assume from the rather common practice of attaching ordinary shock absorbers to rear springs only, that front springs NEEDED no protection. The fact is that the costly mechanism housed underneath the hood demands equally as much consideration as the comfort of your passengers. DANN Insert, which is always installed in the front springs as well as the rear springs, appreciably reduces repair bills and effectively lowers upkeep cost.

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SEE IT!  
7-PASSENGER TWIN SIX CROSSING THE LINE

By  
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EQUIPPED  
WITH THE



**Hartford**  
SHOCK ABSORBER

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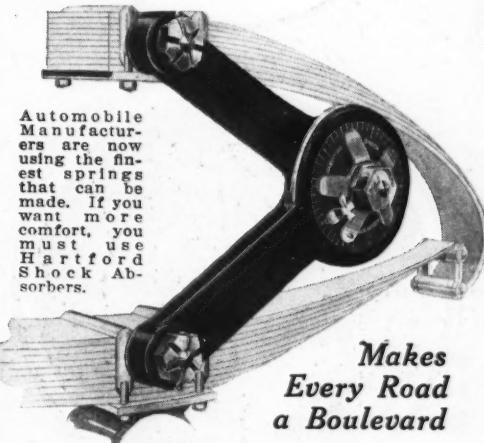
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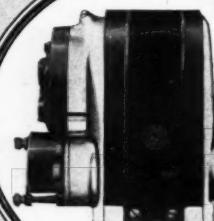


Makes  
Every Road  
a Boulevard

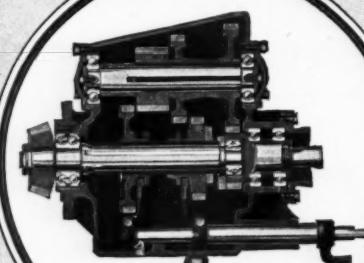
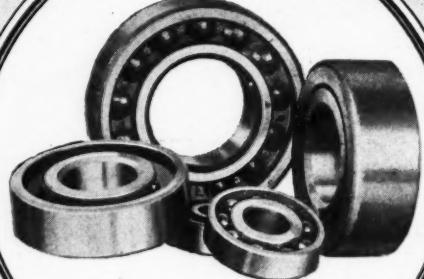
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## American Made for American Trade

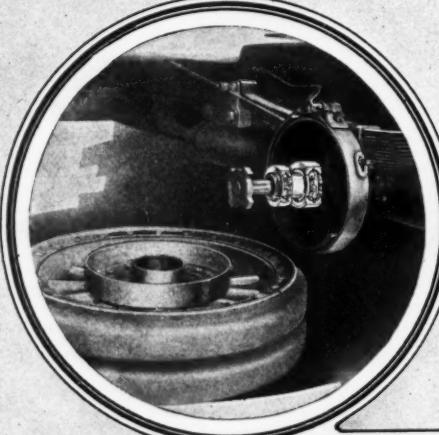
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Light Loads



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Medium Loads



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July 22, 1915

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On this one street anyone can, at a minimum expenditure of time and effort, obtain almost any information about leading cars and equipment.

"Automobile Row" is one of the first places prospective purchasers go to compare the merits of the two or three makes of cars or accessories they have under consideration.

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MOTOR AGE is one of the first places prospective purchasers look for reliable information concerning the products YOU are manufacturing.

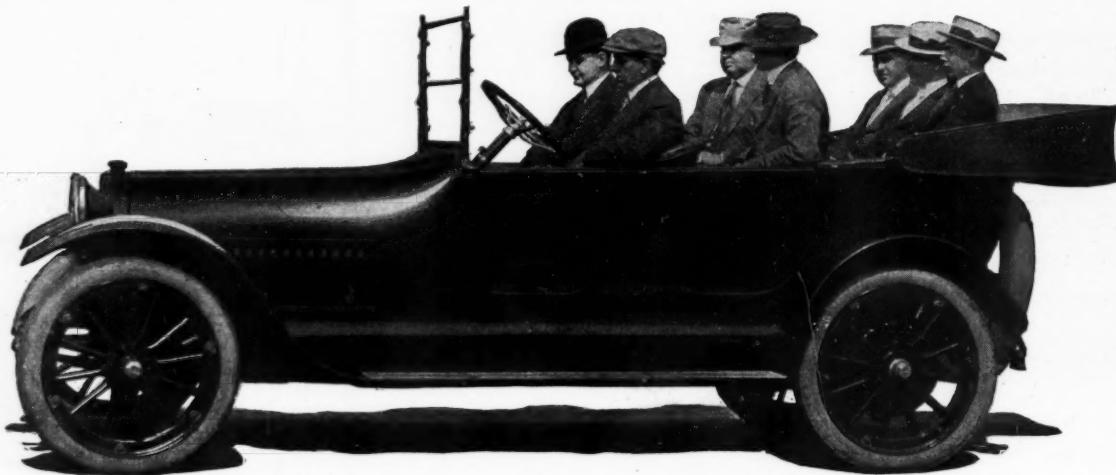
MOTOR AGE will give you good frontage on its "Automobile Row"—let you a salesroom through which 23,000 interested motorists pass weekly. Let us talk it over with you.

**MOTOR AGE**  
910 South Michigan Avenue, Chicago

1916



Cars



(Actual Photograph—Seven Full-size Men)

## —comfort

This illustration gives some idea of the extreme COMFORT of the 1916 Studebaker Cars. Both have been increased in length. The Forty H. P. FOUR to 112 inches. The Fifty H. P. SIX to 122 inches. But the ROOMINESS of the cars is the striking quality, yet the astonishingly light weight, which good design has made possible, appeals at once to the buyer who wants both comfort and economy.

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Touring Car, 7-passenger	-\$1050
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Limousine, 7-passenger	-\$2250

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To progressive men, Studebaker Dealerships offer the most unusual opportunities in 1916 that the industry has ever seen. The line is complete, comprising a variety of styles of closed cars, roadsters and landau roadsters in addition to the touring cars. And the prices and the character of the cars make them the best selling proposition in the field. Since we announced the new line we have had hundreds of applications for territory. And so, we advise every Dealer who wishes to join the Studebaker Selling Organization to write NOW.

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Address all correspondence to Detroit.

# MOTOR AGE

## Motors in the Fields of Mars

European War Develops New Type of Hero,  
the Military Car Driver at the Front

*The author at  
the wheel of  
a French officer's car*

By W. F. Bradley  
Special War Correspondent

*Youthful mascot  
of English motor car  
corps*

As the dinner advanced, tongues loosed, until by the time coffee was ordered the soldiers were exchanging confidences on the number of German swords, rifles and helmets they had stowed away, contrary to regulations, in the houses of friends some distance back of the lines.

"It's easy enough for you fellows driving cars to pick up trophies and get away with them," remarked an artillery officer.

The three drivers present fixed a withering gaze upon him, but said nothing. The artillery officer was emboldened by their silence, and pouring a liberal allowance of vieux Calvados into his coffee cup, he continued:

"You can buy a sword for 10 cents from our men; you can get as many helmets as you like for 20 cents; why one of our men sold an officer's helmet, with bullet hole, blood marks, spike, and all the fourbi, for 35 cents, the other day. What can we do with 'em; we've got more serious work than carting junk around with the batteries. Those motor car driver chaps just come along, buy 'em up, take 'em back to Paris I suppose, say they killed the Boche who was inside the helmet, and then sell the thing for 50 francs.

"O, well, I suppose we do need truck drivers to bring stuff up to the men," he conceded, in reply to a mild remonstrance from one of the party, "but down at Paris they tell me there are hundreds of them 'mother's darlings' just hanging around pretending to drive cars. Why, Chose, of the 19th Escadron, was telling me only yesterday that there's hundreds of them shirkers got soft jobs driving some chef de bureau at the ministry. They take the guy down to the government office at

10 o'clock every morning; at half past two they have to drive the nurse and the kids in the Bois de Boulogne for an hour—if it's fine, and at half past four they take the guy back home. Hard work, isn't it?"

"Trips to the front? Don't you believe it. Why, Chose tells me that if a man gets an idea he's going to have to make a trip out of Paris he just arranges to have to fix up his machine. He told me some funny stories, did Chose, and he ought to know, for he's in the transport service."

"Neuf heures, Messieurs," shouted the restaurant proprietor, at the same time beginning to turn out the lights. Military orders were more important than artillery officers' views on motor car shirkers.

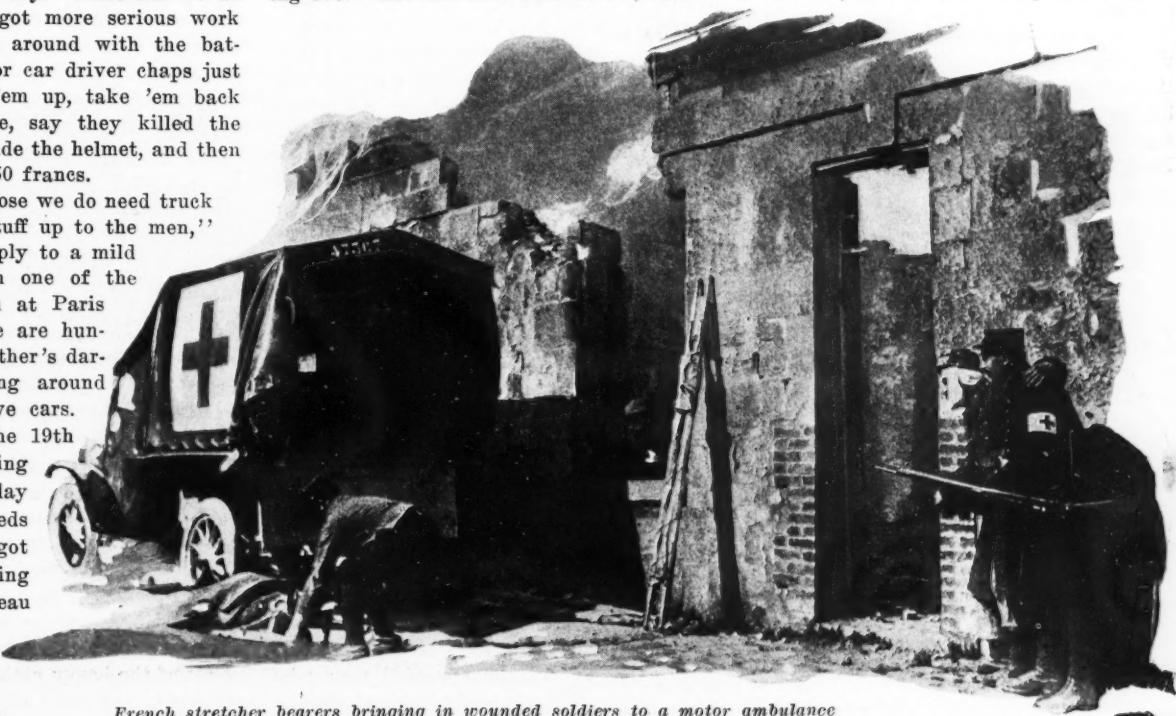
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Twelve hours later we were driving a sinuous course through bombarded Arras, twisting between piles of brick and stone, trying to avoid the stiffened legs of dead horses, and not always succeeding, crunching over what had once been homes, furni-

ture, human bones—who knows. I noticed that our route was not the same as on the previous day. Presently the driver stopped in a broad street and fixed his gaze on something on the opposite sidewalk. The remains of a sign indicated that the lower portion of the building had been a musical instrument shop. Above were six stories of flats. At the foot of the building was a formless mass of wreckage which gradually began to assume some of the characteristics of a motor car. Those pieces of wood had doubtless once been the spokes of a wheel; there was a length of steel which must have been a frame member; a crown bevel wheel, devoid of any easing and with no driving pinion near it, completed the suggestion that this was the debris of a bombarded car.

"Look at the stone wall, just above the wreckage," said my chauffeur.

I looked, and with an inexpressible feel-



French stretcher bearers bringing in wounded soldiers to a motor ambulance



*In circle, stacks of tires and parts in French military depot; at right, open-air motor workshop in rear of French lines*



ing of pity, realized what had happened. The car had been making a trip through the town, probably during the heavy bombardment 2 days before, when an enemy's shell had fallen in close proximity to it. Of the car, not a single unit remained. The driver had been lifted right out of his seat by the force of the explosion and hurled with terrific force against the stone wall. A rough outline of a human being, so rough that one would have had difficulty in naming the mass had not the suggestion been given, marked the wall. No single member was distinguishable, but there was no doubting that the shapeless form had once been full of life, vigor, hope and enthusiasm.

"Only one of those motor car shirkers," remarked my companion, as we drove away.

Here was a new type of war hero, developed in the clash of the European powers.

How American motor cars and American volunteers assisted in Red Cross work on the allies' front is a thrilling story told by Curtis Goode, brother of the Paris manager of the Packard company. When the French armies took up their present posi-

tion after the battle of the Marne, H. H. Harjes, of the banking firm of Morgan, Harjes & Co., secured from ex-Minister of Finance Klotz the use of a suitable building at Montdidier, and furnished it at his own expense as a field hospital. The Packard company supplied eight touring cars, which were quickly transformed into ambulances, and placed in the hands of volunteer drivers operating under the control of the French army. Curtis Goode was one of these drivers.

#### Trips to Firing Line

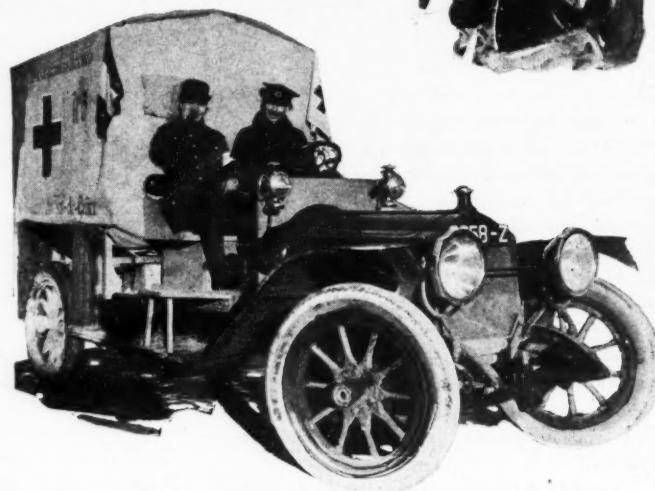
Although the cars were directly attached to the Harjes hospital at Montdidier, they were at the call of the chief military doctor of the district, and had to take cases either to their own or other hospitals, as directed. From October to May, the cars

were engaged in the task of making trips from the hospital to the firing line, the nearest point of which is only 5 miles away, and of bringing in the wounded. For 8 months the sound of guns has been so continuous that when a member of the hospital staff comes home on leave he finds the quiet of the city oppressive. Day and night, at irregular intervals, the call would come for ambulances to bring in wounded. Where road conditions allowed it, the ambulances went close behind the line of trenches, picked up the wounded men who had been carried out by

their comrades, and hurried off with them to the hospital 5 miles behind. By this rapid treatment, thousands of lives were saved and the men spared suffering inevitable with slower methods of transportation.

Both French and Germans are strongly entrenched, with a distance of only 100 yards between them. The position evidently is not of sufficient strategic importance to warrant the loss which would be sustained in a determined attack. Thus the men sit watching one another, and occasionally have the monotony relieved by heavy bombardments.

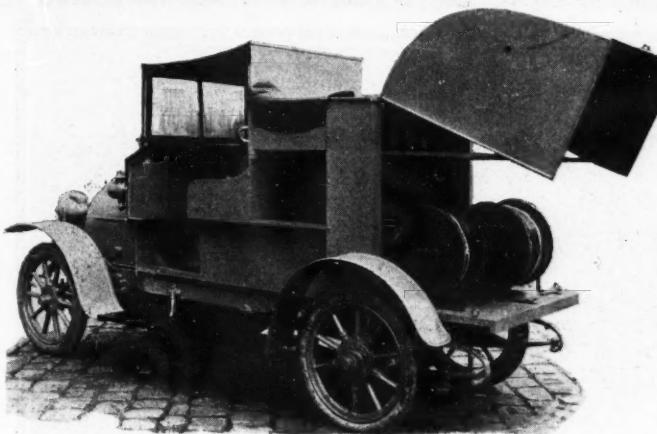
Fortunately for the men, this kind of war is not very destructive. Curtis Goode relates that one evening the Germans began a bombardment on a serious scale. During the entire night big guns boomed as rapidly as if the huge shells were being fired from a machine gun. Occasionally a French gun joined in the welter of sound. Every window in the hospital trembled and rattled from 6 p. m. to 8 o'clock the next morning. The motor staff was up early, expecting to have a busy day. The net result of the heavy night's firing was eight wounded, and none of them in a serious



*Curtis Goode, American volunteer driver of Packard ambulance*



*Motor truck used as a telephone exchange at the front*



Wireless telegraph car with belt-driven dynamo amidships

enough condition to warrant any extraordinary haste to the hospital.

One of the experiences of which Goode has the most lasting remembrance is a trip he was allowed to make one night into the front line trench held by the French.

"We set out from the hospital in a car," he stated, "and for the last 2 miles had to drive in complete darkness, for even a side light would have been observed by the enemy. At an indicated point, we left the car in a farm building and proceeded on foot. At this point, there is a main communication trench 2½ miles long leading right up to the French front line trench, but having branches to other trenches. During the day time, this main communication trench has to be used throughout its entire length, for any person appearing on the open ground immediately would be used as a target. It is along this trench that all supplies and food have to be carried up and the wounded and dead brought back. By reason of the immense amount of traffic and the great length, it is impossible to keep it dry; there generally is a depth of 4 or 5 inches of water, and the men who have made the trip a few times are coated with mud from head to toe.

flat on the ground as soon as a rocket was sent up by the enemy, for if we were observed by their light we should draw the enemy's fire immediately. On that evening, the Germans appeared to be expecting an aerial attack, for they had several searchlights sweeping the sky. We tried to keep our eyes glued on those three beams of light as we stumbled over the rough ground, so as to drop like so many logs, regardless of the kind of ground that might receive us, if the beams were turned in our direction. Fortunately, we were not troubled by the searchlight, but just as we were preparing to get into the communication trench a rocket was sent up and we were obliged to flop.

"From the communication trench we moved into the fighting trenches, each one lined with men keeping a sharp lookout. We were taken into the shell-proof caves, most of them 6 feet underground, to which the men retire when under heavy fire, and

At left, Albert Guyot, the race driver, at the front with a Panhard about to take his commanding officer on a tour of inspection of the front line trenches. Men standing around him have just come off duty in the trenches and are waiting to be taken to the rear in motor trucks. In circle, traveling motor workshop at an aeroplane depot near the firing line

"At the time of our visit, there was not much movement on this portion of the front. Thus the officer in charge of our group decided to travel over the open country, so as to avoid as much as possible the detours of the communication trench. We were warned to be ready to throw ourselves

where the men off duty are able to rest. These are wonderful structures, fitted up with a simple kind of comfort and bearing the most pretentious titles, such as Ritz-Carlton, Grand Palais, etc. Gradually we worked up to the front line trench, where we were only 100 yards from the Germans and in which position we could often hear them talking. It was, however, impossible to catch sight of any of them.

#### New Ethics of Warfare

"These men have been facing one another for so long that a tacit understanding has grown up among them. Thus, if the Germans throw ten hand grenades it is understood that the French will throw back ten times that number. On both sides it is understood that the artillery shall not attempt to hit the men hiding in the dugouts at the back of the line, but shall direct their fire on the guns themselves. In this district numerous shells have exploded on the roads, but they have not made traveling impossible. On the main highways the surface is so hard that the shells do not penetrate and the damage done is annoying only at night if running



How French gun chewed up German truck on a cross-country scouting trip

without lights. On the lower class roads, with little more than a dirt surface, greater damage is inflicted and it is sometimes impossible to pass until soldiers have filled in the holes."

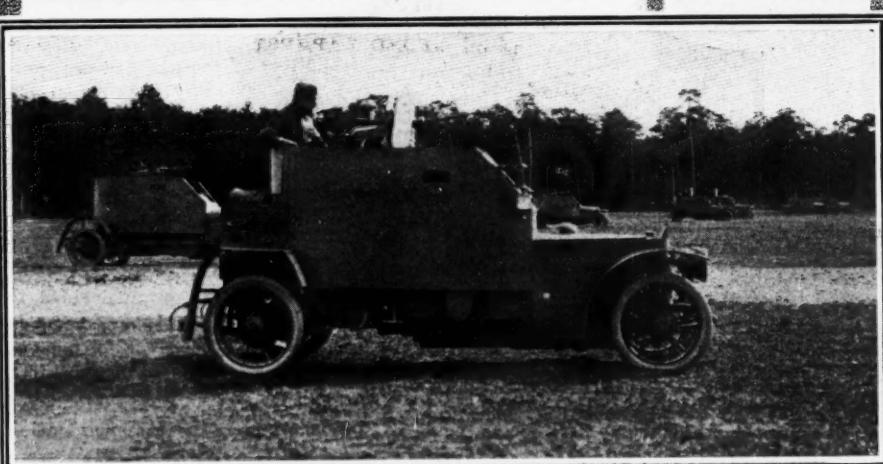
French motor car exports have almost ceased to exist, private sales have been reduced to an insignificant figure, and yet the motor car factories of France have bigger staffs and higher pay rolls than in normal times. The explanation of the apparent anomaly is that the plants are a part of the war machine, and as such are working on the production of the material most necessary to the troops in the field.

Nearly 2 months—all of August and most of September—elapsed before the French army authorities realized what a valuable auxiliary they possessed in the motor car industry of the country. At the present moment that industry is working at full pressure and in the most efficient manner. There have been and still are difficulties to contend with, but they are not of a nature to limit the output of the various establishments. There is an intermingling of the military and industrial life of a continental nation unknown in such a non-military country as America. Yet, although the army experts doubtless realized that they must be seriously dependent on the manufacturing plants of the country in the case of a great war, it needed the war to force home the truth that the factories behind the army are as important as the army itself.

#### Motor Plants to the Rescue

Because of this, the winter campaign was all to the advantage of the allies. It has enabled them, by working day and night, 7 days a week, for more than 6 months, to get together stocks of ammunition, guns and other war material considerably greater than those held by militant Germany on the first day of August, 1914. This change is due, of course, to the military-industrial organization of the country.

The war trumpet cleared the motor car factories of men quicker than the dinner bell ever accomplished it. A few weeks



In circle—White trucks guarded by French sentinel on the docks at Havre. Below—the fortunes of war, a battle scarred French car abandoned at the corner of a village street in Soissons

Upper Illustration—Battery of Hupmobiles recently have been shipped to the Dardanelles European theater of the war. At left—Belgian soldiers inspecting Belgian armored car; note canisters at rear

fighting showed that the guns were using up ammunition faster than the state factories could furnish it, that the number of guns was altogether insufficient for modern requirements, and that the motor service would have to be increased on a scale undreamed of by the most enthusiastic supporters of mechanical traction.

#### Work Is Well Organized

So far as the motor car factories were concerned, this work of supplying material was intrusted to the Service des Forges, which took onto its staff the officials of one of the leading motor trade associations, corresponding in general to the Automobile Chamber of Commerce in America. This association, knowing every detail of the trade, could organize resources much more efficiently than the war department itself was capable of doing it.

There were no men, for in the middle of September three-quarters of the motor car factories of France were closed down. The manufacturers who had accepted contracts for army material drew up lists of the engineers and workmen they required to complete such work. Soldiers in the trenches,



equipped with Maxim rapid-fire guns that after having performed effective work in the armored cars in action. At right—French officer with quick firing gun above it and tool

in forts, and at bases, received orders to return home and take up their ordinary work. These men threw off the uniform, but they did not cast off military obligations. They received the wages they had been drawing before the war, compared with the payment of 1 cent per day while in the field, but they had no right to change their employment for higher pay or any other reason. It is with such military controlled workmen, supplemented by those who are free from army obligations, by refugees from the northern provinces of France and by thousands of Belgians, that the French motor car factories are manned at the present time.

#### Produce 5,000 Shells Daily

The most important work undertaken by the factories is the production of the famous 75-millimeter shells. No figures can be given, but it is possible to state that the output of such shells is prodigious. Many factories are producing as high as 5,000 shells every 24 hours. The army provides the steel bars; the factories cut the bars to length, bore them, turn them, shape them under the steam hammer, heat treat

them, test the metal for hardness, test the shell under hydraulic pressure, make and fit the time fuse, clean and pack them, then send them to the state powder factories to be loaded.

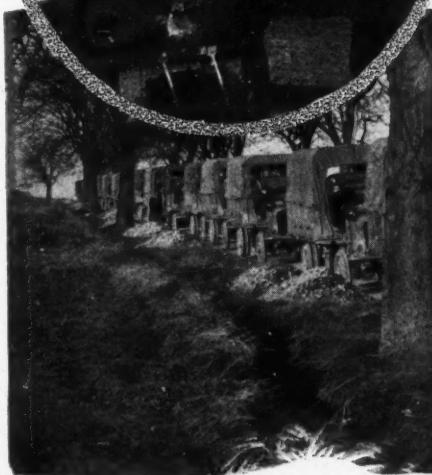
A fixed price is paid per shell. As many small shops with only a dozen or so men and very poor equipment are able to make a living wage on the army contracts, it is possible for the big firms, well stocked with automatic machinery, to clean up a substantial profit. This special war work has caused an enormous demand for American automatic machines, although the heads of some American machine tool firms in France deny that business is good.

In addition to shells, the motor car factories are well equipped for producing tripods for quick-firing guns, aeroplane darts and bombs, aeroplanes and aeroplane motors, and, of course, the usual motor car material for military purposes. The quantity of aeroplanes and aeroplane motors required is one of the many surprises of this war.

#### Little Demand for Touring Cars

Although the French factories are capable of producing a small number of touring cars, they are not seeking to develop business on these lines. Cast steel parts are rare and forgings are difficult to get. As an instance, one firm having to purchase a set of axles to complete a series of cars, was obliged to pay \$26 each for a forging which originally cost \$4. When present stocks are exhausted, it will be impossible to produce more cars.

Internal conditions in France are such that even if cars were built nobody would buy them. Every car owner is liable to have his machine seized for military purposes, and with the possibility of losing \$100 on the transaction, there is little inducement to purchase a new car. The only cars free from the attacks of the requisition officer are light, low-powered, two-seaters or cars having been in service more than 3 years. It is a difficult matter to evade the army impressments. Every motor car in France figures on a military census, together with all particulars re-



In circle—Women and children being removed from Soissons by Red Cross cars. Below—Fleet of Pierce-Arrow trucks drawn up and waiting instructions to advance

garding it down to the make and size of the tires. Some owners who wish to keep their cars for future service have had the idea of sending them to garages to be overhauled, giving instructions that the work should occupy several months; others have sent their machines to the bodymaker for repainting and storage. These attempts at evasion are overcome by army officials visiting the garages, seizing the car in its incomplete condition, having it repaired at the military shops, and deducting the cost of the work from the price paid for the car.

Apart from the requisition danger, the use of motor cars by the non-military public is discouraged. In many cases there is absolutely no reason for this, for there is abundance of gasoline, tires can be had in any quantity and the roads are not encumbered by the military. The writer has frequently made runs of 200 miles each, over main highways, without meeting half a dozen cars, either civil or military. For a depth of about 20 miles back of the 400-mile battle front, there is an army zone into which no civil motor car can penetrate. Behind this zone is a reserved army zone, varying in depth from 20 to 100 miles, to travel in which it is necessary to have a pass delivered by the military authorities; the pass must bear the photograph and signature of every person in the car; it is available for a single journey, on a determined date, over a clearly indicated route, and if used under any other conditions the holder is liable to punishment and loss of the car. Under such conditions motoring is not a pleasure.

Even to travel in and around Paris a special police pass must be obtained and renewed every fortnight. Many docters in

the reserved army zone are not able to get passes to use their cars. The system of examination on the road is not as vexatious as in the early stages of the war. It is sometimes possible to travel 100 miles without having to show the pass, for guards are only placed at the entrance to important towns and on important bridges



Manufacturing 75-millimeter shells for the allied armies in a French motor car factory

and strategic points. But if the pass cannot be produced when asked for, the car will not be allowed to advance another inch. As it takes on an average a week to get each pass, the motor car is the last mode of locomotion the private person considers.

While there is no shortage of gasoline, and the price is but 2 or 3 cents a gallon higher than a year ago, the supply of benzol has been entirely cut off. This does not seriously affect the private motorist, but is a matter of considerable concern to taxicab drivers. Owing to its lower first cost, as well as to the fact that town duty is about 10 cents per gallon less than on gasoline, every taxicab driver uses benzol. The whole of the available supply of this

fuel has been requisitioned for making explosives, thus forcing taxicab drivers to consume gasoline.

The rubber situation appears to be very satisfactory from the standpoint of the army. Up to recently the tire factories in France were given monthly contracts and were allowed a sufficient number of men to deliver the goods. This has been changed, the army now placing definite orders from time to time. Indications are that the army possesses stocks of solid and pneumatic tires for a long period ahead and can maintain them without working the factories at more than a fraction of their strength. Orders have been placed for millimeter size tires to be fitted to American trucks as soon as the inch size tires need replacing. The disadvantage to the tire companies under these new conditions is that they have less guarantee that the men will be allowed to remain at work.

Some annoyance is caused by the calling up of men of more than ordinary value to the factory, and when a new man has been trained, there is no assurance that he may not receive notification from the army to take up a rifle.

#### JITNEYS INVADE MARTIAL PARIS

Paris, July 12—Paris has come into line with American jitney cities. The innovation is due to the necessities of warfare and is countenanced by the municipal authorities and the established transportation interests. When her 1,100 motorbuses were swept into the war machine, the center of Paris, into which trolley cars are not allowed to penetrate, found itself with no other means of transportation than the subway. When the army had taken all the motor cars that were worth taking, enterprising individuals found a few old-time vehicles which could be used for a jitney service.

In every case, the driver is a man, but on every jitney the conductor is a woman. Men are too scarce in France at this time to be used for the easy task of punching 4-cent jitney tickets. Although there is no coöperation, the jitney owners have mutually agreed on a 4-cent fare. It is 1 cent more than was charged by the former motorbuses and also 1 cent more than the subway fare. Day after day, a revival of the bus service is announced, but to the satisfaction of the jitney owners the new vehicles fail to appear. When the buses are put on the streets, the jitneys will be obliged by force of competition to retire; but it is doubtful if they will disappear entirely.



Motor car mechanicians engaged in the task of making munitions of war

# Turns Out 300,000 Fords in Year

## Plant Passes Mark Set for Production in Twelve Months —Owners' Rebates Assured

DETROIT, Mich., July 16—The goal set by the Ford Motor Co. last August for July 31, 1915, was reached at 1:25 p. m. today—the production of 300,000 cars has been crowded into 15 days less than 1 year. Not only is this a record for the Ford company, but a world's record as well, since no other motor car manufacturer has approached such a volume of output, even in 2 or 3 years. Therefore, Ford owners are assured of the \$50 rebate on the purchase price of new cars bought since August 1, 1914.

The prophecy that 300,000 Ford cars would be made in the 1915 fiscal year has been realized and the total production for the year ending July 31 will be nearly 315,000.

This production by no means will mean that it has been the most the Ford company could make. At the present time the company is not running to its full capacity, but as is always the case when nearing the end of the fiscal year production is slackened when the factory is about to take its annual inventory.

Incidentally, it might be mentioned that the history-making car No. 300,000 bears motor No. 850,938, which would seem to mean that up to that time just that many Ford motors, or Ford cars, have been made and sold. The first Ford car was made in June, 1903, only 12 years ago, and that the output during the first year was of only a few hundred cars.

### AUBURN FOUR AND SIX IN NEW GARB

Auburn, Ind., July 20—Two chassis, a four at \$985 and a six at \$1,550 and four body styles, two on each chassis, are on the production program of the Auburn Automobile Co. for 1916. These cars are continuations of the former models, insofar as the essential chassis units are concerned, but the body is entirely new and detail refinements are noted throughout. For the new season, Auburn cars will have canti-

lever springs. The bodies have better lines and are roomier than before and the auxiliary seats are of the disappearing type.

The four has a 114-inch wheelbase and a block-cast T-head 3½ by 5 motor. The six has an L-head, 3½ by 5 motor and a 126-inch wheelbase.

### MUTUAL MOTORS TO HANDLE SALES

Jackson, Mich., July 19—The Mutual Motors Co., which since the first of the year has been manufacturing cars for the Marion Motor Co. and the Imperial Automobile Co., both of Jackson, has taken over all sales rights for these two cars. The manufacture of the cars of course will be continued by the Mutual company. The Marion and Imperial companies have acted mainly as selling corporations and will continue to exist, having ownership of the physical assets of the plants. Neither the assets nor the obligations of the companies were taken over by the Mutual concern. The two lines of cars will remain practically unchanged except for price reduction. The Imperials, a four and a six, sell now at \$995 and \$1,185, respectively, being a reduction of \$90 in the one case and \$100 in the other. The Marion six has been reduced from \$1,250 to \$1,185.

### JUNE SHIPMENTS BREAK RECORD

Toledo, O., July 17—The June shipments of the Willys-Overland Co., amounting to 9,010 cars, show an increase of 163 per cent over those of June, 1914, when 3,298 cars left the Toledo factory. In the first 6 months of the calendar year, the com-in Detroit.

pany has shipped almost as many cars as they did during the entire 12 months of 1914, or practically double its last year's output. The previous high water mark in Overland production was in the month of March, when 7,005 cars were shipped. The record shipment for June exceeds these figures by about 3 per cent.

### MORE TALENT FOR SCRIPPS-BOOTH

Detroit, July 20—Alanson P. Brush, of the Brush Engineering Association, has been retained as consulting engineer for the Scripps-Booth Co., on its 1916 models. W. B. Stout, chief engineer, also receives the added title of advertising manager of the Scripps-Booth concern, to take effect August 1.

### KING ADDS 3-PASSENGER ROADSTER

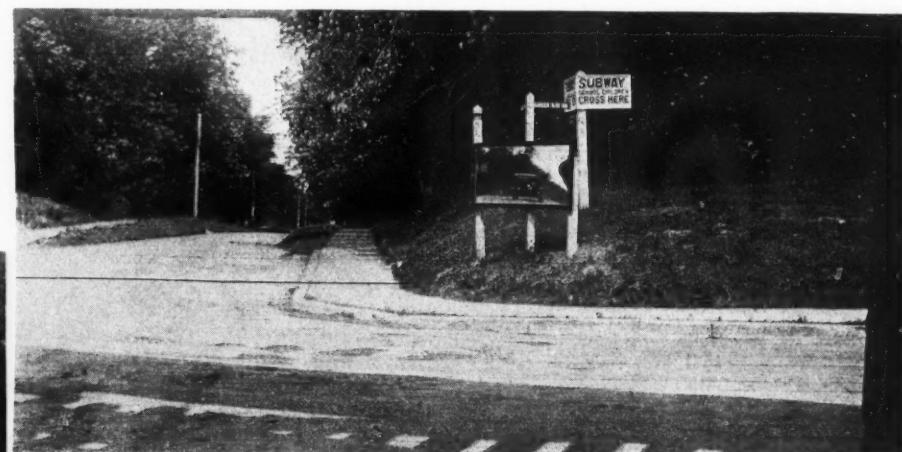
Detroit, July 21—In addition to the eight-cylinder touring car which the King Motor Car Co. has been marketing for some time, a roadster body seating three, will be mounted on the same chassis and sell at the same price—\$1,350.

### WILL BUILD LIGHT TRUCK

Hannibal, Mo., July 17—The Hannibal Wagon Co. will soon begin the manufacture of a light commercial motor truck, the price of which will be in the neighborhood of \$500. The new vehicle will be known as the Hannibal truck.

According to Manager LaBlond, the company has an initial order for 100 trucks, which are to be delivered as fast as they can be put out of the factory. A large extension to the wagon plant at South Tenth and Collier streets is now being planned.

An engine especially designed for the Hannibal truck now is being manufactured in the com-in Detroit.



VILLAGE PUTS MIRRORS AT BAD CORNER

An unusual method of making bad road intersections much less dangerous has been adopted by the village board of Glencoe, Ill. Large mirrors have been installed on the corners in such a way that a driver can see whether or not any other vehicle is approaching the corner at one intersection of two heavily travelled motor roads; one passes under a railroad viaduct just before its intersection with the other.



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## Yellowstone Traffic Rules Reasonable

UNCLE SAM has weighed all the contingencies that might mar the advent of the motor car into Yellowstone national park next month and, seemingly with the safety of his nephews and nieces as his first and foremost thought, has designed regulations that will make for the permanency of motor travel through America's national playground. The rules, which are digested in another portion of this issue, may be considered unnecessarily strenuous by motorists unacquainted with conditions at the park, but they must be accepted patiently and in a sportsman-like spirit.

IT must be remembered that horses in the Yellowstone and those in the city streets have little in common so far as temperament is concerned. The horses used in the park have accustomed themselves to hang over dizzy heights that the ordinary horse would not approach, but they have not accustomed themselves to motor cars, and cognizance of this fact has had much to do with the formation of the new traffic rules. Aside from danger to themselves through fast driving, motorists would undoubtedly cause injury to passengers in horse-drawn vehicles were they allowed to cover the park as they would a country road.

## Rear Wheel Guards

INVESTIGATIONS of accidents in several of the large cities in which motor trucks and motor passenger buses have played a part have proven that there are as many persons fatally injured by being run over with the rear wheels as with the front wheels. Paradoxically as this may seem, it is still a fact, and a pertinent one, in that it suggests along what lines improvements must be made to make our streets safer. The din of the city street is largely responsible for the confusion which causes pedestrians to walk into the side of a motor vehicle while apparently endeavoring to avoid some other vehicles.

THE question of the rear-wheel fender has been actively taken up by one large private company and a simple form of lattice fender or guard attached to the side and extending from the front to the rear wheel used. Such a step by a private corporation is one to be imitated. The cost of such a fender is small and the company considers that it is an excellent investment to spend a small sum in possibly avoiding several accidents. This is a healthy sign, where private interests are devoting efforts to eliminating accidents. This is positive legislation, and work of this kind is bound to result in much more good than loading our statute books with stupid regulations that cannot be enforced.

WHAT is needed today is more education and less legislation. We have too many laws and very little sensible enforcement. The work of one concern taking the initiative in this way is worth a safety deposit vault full of laws. Where private organizations look to their own best interests in this way, an example is set which should be followed by all other corporations operating large fleets of motor trucks. Each concern can work out some suitable form of fender or guard to meet its own requirements.

THE initial set of rules is to be used as a trial regulation. Each year may see them given more elasticity as conditions warrant, but the government of motor traffic this year will work no hardship on the motoring public. Motorists should feel that an experiment is being made that is not without certain risks, and should make the best of the conditions.

RIGID penalties for driving faster than the schedule times, with which every car driver entering the park will be furnished, obviate the probability of speeding. Roads in the park were not designed for motor traffic and this has had its bearing on the speed limit set. It will take a season or two to learn what improvements will be necessary to bring motor travel through the park to its highest plane. Sanity has been displayed in the formation of the new rules and those motorists who will exercise sanity in driving will find them reasonable. Proper adherence to the regulations should preclude the possibility of marring the initial entrance of motorists to this heretofore forbidden territory. If this season can pass without accidents through having let down the bars to this class of traffic, another year will see more freedom.

## Licensing New Drivers

THE state departments, which have charge of the registration of motor cars, are so lax in their work that in not a few states it is possible for persons, not in any wise entitled to get permission to drive, to do so. A letter to the motor vehicle registration department with the necessary fee and a car's details is all that is needed to bring the license tags and the credential card entitling the person to use the car. Cases are on record where the parties making application and receiving registration have never driven cars and are not in any wise capable of doing so. Further records show how accidents, sometimes fatal, follow on some of these registrations. It is an exceedingly difficult problem to solve but it does seem that every person being registered should demonstrate his ability to drive a car before the permission finally is granted. Once a person has been registered it is different, but with the first-timer some additional precautions would result in a certain elimination of accidents.

In solving such a problem, the registration should continue as a state work but local authorities should be empowered to see that the applicants are able to drive and properly control the vehicle on the highway. Such a regulation would not make it impossible to learn how to drive a car; it would, however, make it understood that each beginner would prepare himself or herself for the work so that before the state added its approval it would be sure that the elements of competency were possessed by the applicants. Such a mode of procedure could be worked out with very little difficulty and it would result in considerable good. It would be the means of discouraging driving cars that may not be safe to operate, and a simple elementary examination and a simple practical test would be highly desirable. Such would make our highways safer for these owner-drivers, who have been driving for 10 years, and would also make them safer for our pedestrians.

# Pennsylvania Forms Patrol System for Road Repair

Corps of 190 Men Will Keep Highways in Condition in Forty-Six Counties of the Keystone State—Approximate Expense \$65 per Mile

HARRISBURG, Pa., July 19—Pennsylvania, noted for its good roads, is about to inaugurate an innovation in a system for keeping its highways in repair and under State Highway Commissioner Robert J. Cunningham, the Keystone state will add a new feather to its cap when, on August 1, the new patrol system goes into operation.

The plan is to embrace forty-six counties, which will be in the care of one hundred and ninety men, who will assume the responsibility of keeping the roads in repair. Their wages will run from 15 to 20 cents an hour, according to the scale of wages in the district in which they work. According to the old plan, it cost \$500,000 a year to do what road officials now expect to accomplish for \$120,000, or \$65 a mile per year.

The idea will be worked out on the same plan as that followed by the railroads for a number of years. They have successfully proved the plan a good one and there is no reason why it can't work out on the highways.

Each man will have a certain number of miles in a given district, which will be known as his own. If the work done is satisfactory or otherwise, he will be the one to receive praise or condemnation. In places where there are no bad curves to keep clear or no peculiar formations to deal with the number of miles allotted to each man will be six. The necessary tools and equipment will be furnished him and when he is absent for any cause from work, he will place a small red flag in a conspicuous place.

The men will make daily reports to the county superintendents, who will make out the pay rolls for the number of hours which they have worked. The men will be under the supervision of the county superintendents, who are supposed to see that they are reliable, honest and efficient.

By this new system, when a small hole appears in the road, it will be given prompt attention. Before, the holes were left to grow larger until it finally became necessary to resurface the road. With this new plan in operation the life of the roads will be doubled.

## MERCEDES BUILT FOR WAR USE?

London, Eng., July 12—A statement has been made by a former German prisoner who has just arrived in this city, that all German Mercedes cars were built for possible use in war. C. B. Pray, an American motor mechanic, states that his work up to the time of his arrest brought him into daily contact with the German Mercedes car. He says the chassis of every car of

the 1912, 1913 or 1914 models was perforated at the sides with two sets of four holes each, at equal distances from the front and rear, for the purpose of riveting over the chassis frame a plate heavy enough to bear a weight of 1,000 kilograms.

In May and June, 1914, the cars were called in for inspection and returned with the plates mentioned duly affixed without the owners' knowledge of what had been done. When the cars were requisitioned for war only the tops had to be ripped off and gun and searchlights mounted in their places.

## JITNEYS EARN \$1,250 DAILY

St. Louis, Mo., July 17—A good example of how great an extent jitneys are cutting into the revenues of street railway companies is contained in the report just

filed by the United Railways of St. Louis with the city register. The report shows that during the 3 months ending June 30 of this year, the company carried 6,324,378 passengers less than during the same 3 months of the previous year. Officials of the United Railways insist that this reduction in travel on their cars is due mainly to business depression rather than to the advent of jitneys into the transportation field. Figures recently compiled by city employes, however, tend to contradict the assertions of the United Railways.

Men appointed by the street commissioner recently counted 552 eastbound jitneys on one street during one morning and 385 westbound jitneys on the same street that afternoon. Multiplying the sum of these numbers by two we get 1,874, the number of jitney trips counted on one street.

# See America First — • • • See America Now



EDITOR'S NOTE—This is the thirty-fifth of a series of illustrations and thumb-nail sketches of scenic and historic wonders of America to be published in Motor Age for the purpose of calling the attention of motorists to the picturesque points of interest in their own country.

### NO. 35—WILLIAM HARLOW HOUSE, PLYMOUTH, MASS., BUILT IN 1677.

LESS than three-score years after the Pilgrim Fathers landed at the historic Plymouth Rock, Old Burial Hill fort at Plymouth, Mass., had served its usefulness and was dismantled. One William Harlow secured timbers from the razed fortress and built the house shown herewith in 1677. This house is shown as it looks today. Built of wood, 238 years ago, it has the appearance of being a twentieth century production. This old mansion shares honors with other historic relics of the old colonial days in and about Plymouth, and is visited every year by the many tourists who motor over colonial highways.

# Hudson Captures Denver-Cheyenne Reliability Race

Winning Car Completes 112 Miles at Average of 41 Miles an Hour

DENVER, Colo., July 17—Sam Stevens, at the wheel of a Hudson six, captured first honors in the 112-mile road race and economy run between Denver and Cheyenne, Wyo., today, covering the distance in 2 hours, 43 minutes and 29.6 seconds and clipping 6 minutes off the record of last year when E. J. Johnson's Lozier was the first car to get the checkered flag at Cheyenne. The Hudson was a post entry, being nominated less than 2 hours before the start.

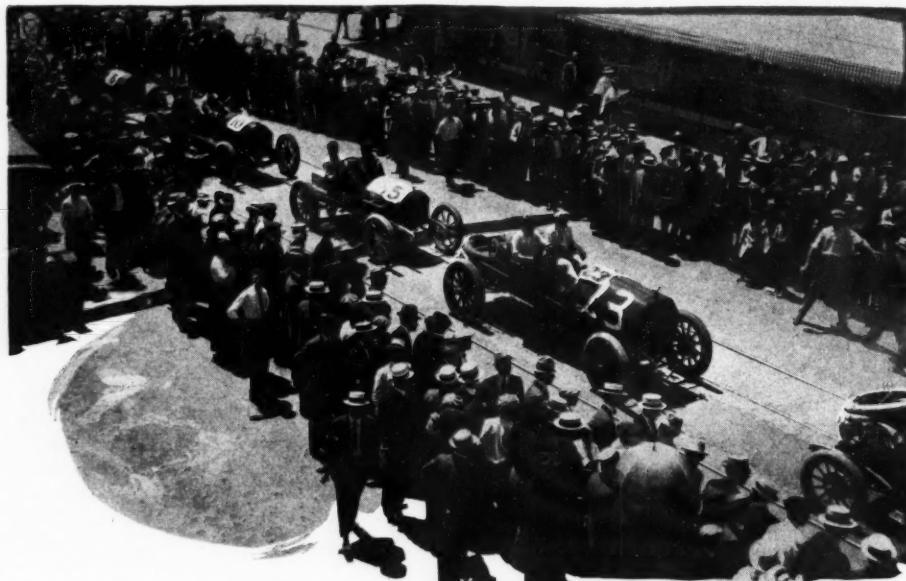
The second car to finish was a Metz, driven by Leon Nelson, whose time was 2 hours, 54 minutes, 45 seconds. A Saxon, with Victor Herbert at the wheel, was third in 3 hours, 8 minutes. These were the only starters in the professional division to finish, the Mercedes, Cadillac, Oakland, Studebaker, Amplex and Big Chief being eliminated with engine trouble before the first 70 miles had been covered.

Today's race, held under the auspices of two local newspapers and the Denver Motor Club, was sanctioned by the American Automobile Association and served as Denver's contribution to the Cheyenne Frontier Day's celebration, which opens next week. There were two speed divisions, one for professional and one for amateur drivers, a division for economy and another for consistency.

Although thirty-four cars were entered, there were only twenty-two on the starting line when the field was checked out here at 1 o'clock. Among the competitors was a woman driver, Miss Gladys Moore, who entered her Grant in the consistency and economy division.

The special trophy for the free-for-all class for professional drivers in stripped cars was put up by the Cheyenne Frontier Days committee. The prize for the amateur speed class for owners and amateurs in stock cars with only tops and windshields removed, was a silver punch bowl offered by the newspapers conducting the event. The papers also furnished the consistency trophy, and the economy cup for lowest gasoline consumption was provided by Charles L. Newcomb, Jr., president of the Lincoln Highway Association of Colorado.

The professional speed entrants were given a 4-mile start over the amateurs, and these in turn were well on their way before the consistency and economy contestants were allowed to start. The course was well



START OF THE DENVER-CHEYENNE SPEED AND RELIABILITY CONTEST

policed and full speed was possible through all the towns along the route. Assistant timers were stationed at frequent points to catch any new records for special sections of the course.

## OPEN SPEEDWAY SATURDAY

Des Moines, Ia., July 19—Des Moines' new 1-mile speedway will be dedicated Saturday with several exhibition events to whet the appetite of the fans for the 300-mile race to be held on the board oval a week later, July 31. Eddie O'Donnell, at the wheel of a 360-inch Duesenberg, will go after the 100-mile record and Barney Oldfield, driving his Christie, will attempt to set new marks for 1, 5 and 10 miles.

Three Duesenbergs have been entered in the 300-mile race of July 31. Two of them will be driven by Eddie O'Donnell and Tom Alley. Rickenbacher, who is now at liberty as a result of the withdrawal of the Maxwells, may drive the third car. Oldfield and de Palma also are entered in the three-century event.

The promoters anticipate an attendance of 40,000 persons at the race. The advance sale of tickets has been heavy, all of the 1,000 box seats in the grandstand having been sold.

## BUYS STUTZ FOR DE PALMA

Chicago, July 17—E. C. Patterson, of Chicago, backer of Ralph de Palma in his racing campaign, today purchased one of the 300-inch cars made by Harry Stutz for this year's contests, the one driven by Howdy Wilcox at Indianapolis and Chicago. Before today's deal was consummated, the car was entered in the Elgin road races by de Palma, who has secured Caleb Bragg to pilot it.

The outright purchase of the car is the result of a deal in which Stutz offered de Palma the management of the Stutz team. The Italian consented to take over the cars provided he could campaign them

with his Mercedes, but the Indianapolis maker refused to agree to any such arrangement.

The sale of the Stutz to Patterson does not mark the retirement of the Stutz company from the racing game. It has two cars on hand, one at the factory and the other on the Pacific coast, and is building a third at the present time. All three cars will be entered at Elgin, according to Stutz, and in the fall speedway meets.

De Palma is delighted over the acquisition of the Stutz to his racing stable, since it gives him an emergency car that he can drive should his Mercedes be out of commission, as it was at the time of the Chicago race.

## OLDFIELD TO DRIVE DELAGE

Chicago, July 19—After a quest covering 3 months, Barney Oldfield at last has secured a car for the Elgin road races and the fall speedway campaign. The "master driver's" new mount is a Delage, one of the three built by the French maker for the 1914 grand prix. It was ordered by cable 5 weeks ago and arrived in Chicago this morning.

The purchaser of the car is David G. Joyce, of this city, chairman of the touring bureau of the American Automobile Association and an ardent racing fan. The local sportsman has presented Barney with the Delage and will back him at Elgin and in the speedway races at Minneapolis, New York and Chicago.

The Delage is unique in that it has no valve springs, the valves opening and closing positively. The piston displacement of the motor is 271 cubic inches. The car is equipped with Bosch magneto and Claudel carburetor, its wheelbase measures 106 inches and it weighs about 2,400 pounds.

Since the Bugatti, which Barney was slated to drive at Indianapolis and Chicago, was put out of commission in practice for the Hoosier classic, Oldfield has

been attempting to get a car. He first offered to buy one of the English Sunbeams and then cabled to France for a Peugeot, but failed to put through either deal.

This afternoon Oldfield wired a challenge to Dario Resta for a 100-mile match race to be run on the Chicago speedway August 7 and posted a side bet of \$2,500.

#### SPEEDWAY FOR BUENOS AIRES

Chicago, July 19—South America is to have a motor speedway. As representative of a syndicate of business men of the Argentine republic, Tex Rickard, the sport impresario who was prominent in the promotion of the Jeffries-Johnson fight at Reno 5 years ago, arrived in Chicago yesterday to inspect the local speedway and will also look over the Sheepshead Bay track before returning in September to Buenos Aires, where the South American course will be located.

According to Rickard, the syndicate he represents contemplates the construction of a 2 or 2½-mile board speedway, which will be ready for an inaugural race, 500 miles in length, by Christmas day, 1916. As there are few drivers and racing cars in South America, \$25,000 will be divided among the star pilots of the United States and Europe for expense money. A purse of \$100,000 will be hung up for the opening race.

#### MOTOR RACE IN MEXICO

El Paso, Tex., July 19—The El Paso Automobile Club has applied to the A. A. A. for a sanction for a 300-mile race to be run over the 1-mile track of the Juarez Jockey Club, just over the Mexican border, the last week in September. The promoters will bank the turns heavily, so as to make them safe and increase the speed. Purse aggregating \$5,000 will be hung up for the several races, which, in addition to the proposed 300-mile event, will make up a 3-day program now in mind. Transcontinental travel, to and from the expositions at San Francisco and San Diego, will be at its height at the time the races will be held, insuring a good attendance at the meet.

#### GOVERNOR TO OPEN TENT SHOW

Indianapolis, Ind., July 19—Governor Ralston will assist in the opening ceremonies of the Indianapolis Automobile Trade Association exhibit at the fair grounds during the state fair September 6-10.

## Tacoma Decides on 1 Day of Racing

### Potlatch Trophy Event to be Abandoned and Distance of Montamarathon Increased

TACOMA, Wash., July 16—Two races, instead of three, and both to be held on one day, is the program decided upon for the 1916 speed carnival by the directors of the Tacoma Speedway Association this week. The Montamarathon and the Inter-city contests will be retained, but the 200-mile Potlatch trophy event will be abandoned.

The distance of the Montamarathon, the feature event of the meet, will be increased from 250 to 300 or 350 miles, and the Inter-city race, in which only native drivers of the northwest are eligible to enter, will be run simultaneously with it. A purse of \$10,500 will be hung up for the Montamarathon alone and in addition, \$100 will be given the leader at the completion of each 100 miles.

Heretofore, the Tacoma meet has been of 2 days' duration. The majority of the cars are nominated for both days and this year, many entrants were forced to withdraw their mounts the second day because of mechanical ailments suffered in the Montamarathon, which was held the first day. One day of racing will eliminate these eleventh-hour scratches.

The date of the 1916 meet has not been decided upon. This matter will come up at a meeting of the American Automobile Association and the Speedways Association of America in October, when a schedule for the coming season will be drafted.

The local promoters have decided to put a heavy guard rail at each edge of all the curves of the speedway to safeguard the drivers against accidents similar to that in which Billy Carlson, the Maxwell pilot, lost his life here July 4.

#### HOOSIER SECTION CHANGES DATE

Indianapolis, Ind., July 19—A change in date has been made for the opening meeting of the Indiana section of the Society of Automobile Engineers. The meeting originally was announced for September 17, but it has been put back a week later, which will be September 24, at the request of J. G. Vincent, vice-president and chief engineer of the Packard Motor Car Co., who will be the principal speaker of the evening.

Fred Moskovics, chairman of the section, announced that students of the mechanical classes in Purdue university want to attend the meeting and it was advised that September 24 was the best date for students and professors. The added feature of the meeting will be an address on aluminum pistons by James E. Diamond, engineer of the Aluminum Casting Co. Mr. Vincent's subject will be "Modern Tendencies in Motor Design."

#### Premier May Move to St. Paul

Indianapolis, Ind., July 20—Upon his return from a trip to St. Paul, Minn., Frank E. Smith, trustee for the Premier Motor Mfg. Co. gave out a statement that the Premier company was seriously considering the moving of its entire establishment to that city. The rumor that a movement was under way has been persistently denied by the Premier company until today. Smith stated that St. Paul capitalists had made an attractive offer for the taking over of the company through the St. Paul Chamber of Commerce. While Smith would not make public any details, he said that the deal may be completed in 30 days.

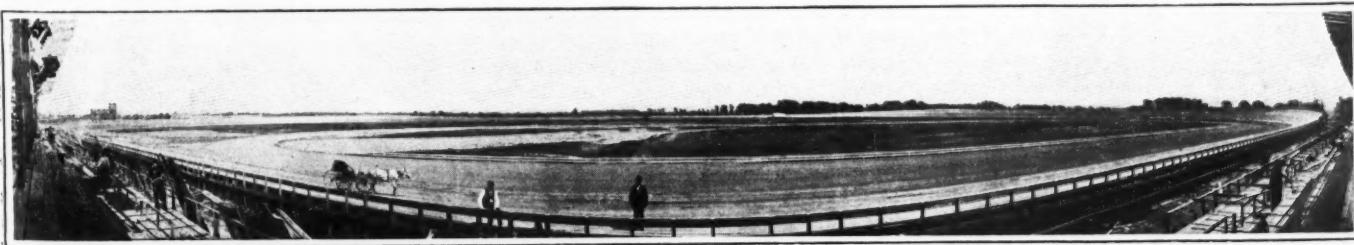
#### Heinze to Build Starters

Detroit, July 20—J. O. Heinze, for nearly 5 years chief engineer of the Northway Motor and Mfg. Co., has resigned to go back into electrical work, having organized the J. O. Heinze Co. at Springfield, O., to manufacture electric starters and other electrical apparatus for motor cars.

William Pfum, former manager of the National Cash Register Co., and later head of the Wagenhals Motor Co., and A. S. Knoblock, general manager of the Northway company, are among those associated with Mr. Heinze in the new enterprise.

#### Pope Plant is Sold

Hartford, Conn., July 21—(Special telegram)—The Westfield plant of the Pope Mfg. Co. was sold at public auction yesterday afternoon to H. Preston Coursen of New York, representing Wilbur C. Walker of the Hartford Motor Car Co., and a former officer of the Pope company, and Scott McLanahan of New York, for \$725,000.



VIEW OF NEW DES MOINES SPEEDWAY WHICH WILL BE DEDICATED WITH 300-MILE RACE JULY 31

# Colorado Licenses Gain 50 Per Cent

## States Report on Car Registrations—Massachusetts Fees Exceed Million

DENVER, Colo., July 16—A total of 21,828 motor cars, representing 197 different makes, is Colorado's registration for the first 6 months of 1915. This is a gain of more than 5,000 cars, or 30 per cent over the same period last year, and a gain of 3,395 cars, or 18 per cent, over the total registration for 1914, which was 18,433.

Besides heavy sales this year, two other factors are named by Secretary of State Ramer as helping strongly toward this increase. One was the system adopted by retiring Secretary of State Pearce of starting the 1915 registration December 1 instead of waiting till January, which was followed by Secretary Ramer with rigid insistence upon prompt registration throughout the state. The other has been Mr. Ramer's introduction of a license inspection system, which has brought in a large number of delinquents. In addition to these influences, extensive road improvements throughout the state and an earlier opening of the roads in general from snow and other hindrances to travel have played a part worth mentioning. Good crops last year and good prospects for this year have greatly helped along the sales feature, and the motor car dealers are highly elated over the way Colorado people are buying machines to tour their own state and demonstrate to the motoring world Colorado's prominent place in the "See America Now" movement.

### County Gains 348 Per Cent

Of the total number of cars in the state shown by the June 1 returns, 6,705 were registered from Denver and 15,123 from the outside counties. Denver's increase is 585 cars above the total of 6,120 for last year, or a gain of nearly 10 per cent.

With the prominent exception of Mesa county, on the western border, the eastern part of the state shows the main bulk of the increase. Mesa county has 396 cars for this year, as against 316 for 1914, or an increase of 26 per cent. Among the eastern counties leading in the gain are Arapahoe, joining Denver on the south, with a gain of from 210 to 346, or 64 per cent; Weld, two counties north of Denver, showing 1,170 to 1,430, or a gain of 22 per cent; Phillips, near the northeastern corner, with 220 to 162, or a gain of 35 per cent, and Baca, in the extreme southeastern corner, with a jump from thirty-seven to 166, or a 348 per cent gain. This is the record for the state.

The only county not reporting any cars since the new state motor vehicle law went into effect 2 years ago is Dolores, in the extreme southwestern corner of the state, a thinly-settled, mountainous section. San Juan, also in the mountains and at an alti-

tude where the snow stays late, has not reported any registration so far this year, but reported three cars late in 1914. Some of the mountain sections have shown a pleasing increase, which is thought to be due in part to a substantial growth in the metal mining industry during the last year or two.

Classified, according to style of car, horsepower rating and kind of motive power, the registration is as follows:

Class	Denver	Outside counties	Total
Gasoline passenger cars up to 25 h. p. ....	3,061	8,699	11,760
Gasoline passenger cars above 25 h. p. ....	2,495	5,495	7,990
Electric passenger cars. ....	493	189	682
Steamers. ....	64	105	169
Gasoline trucks. ....	308	79	387
Electric trucks. ....	33	4	37
Dealers' cars (class not specified) ....	251	552	803
	6,705	15,123	21,828
Total gasoline pleasure cars: Denver, outside counties, 14,194; entire state, 19,750.			

Of the 197 different makes represented in the state, the leading six rank as follows:

Class	Denver	Outside counties	Total
Ford. ....	2,132	6,286	8,418
Buick. ....	323	1,266	1,589
Overland. ....	468	1,076	1,544
Studebaker. ....	324	635	959
Maxwell. ....	415	499	914
Cadillac. ....	330	428	758

Besides the regular Studebaker, there are also 315 registered as E. M. F., sixty-four being in Denver and 251 outside.

Secretary of State Ramer estimates that the total registration for 1915 will come close to 28,000, which will be an increase of 50 per cent over last year. He estimates that the total revenue for 1915 from all motor vehicles and drivers' licenses will be approximately \$125,000, as against \$80,000 in 1914. More than \$100,000 of this will probably be available for road work through the state and county highway funds, the net motor vehicle license revenue being divided equally between the state highway fund and the road funds of the respective sixty-two counties individually in proportion to the fees collected by each county. The net amount of this revenue so divided for road work last year was \$76,600.

### LICENSE FEES EXCEED \$1,000,000

BOSTON, Mass., July 17—Massachusetts motorists have poured into the state coffers more than \$1,000,000 for the first 6 months of this year, and the registration figures will exceed 100,000 for 1915 without any doubt. Even now, with the year half gone, it takes at least half an hour to get a car registered at the highway commission's headquarters, and every day there is a line extending out into the hallway waiting to get numbers.

For the first 6 months of 1915 there were 83,868 machines registered in the Bay state. That was an increase of 19,252 over

the same period of 1914, and 6,652 more than had been listed for the entire year. About \$200,000 more than was paid for the first 6 months of last year has been taken in for the same period this year, and it is about \$34,000 more than was secured for the full year of 1914. Before the season ends it is expected that at least \$1,250,000 will be paid the state by motorists. The increase shows an average of 27.5 per cent above the figures of last year, a very big gain, which shows that New England is prosperous.

The number of people securing drivers' licenses is increasing rapidly until now about one in every twenty-six Massachusetts residents is allowed to drive a car. This increase is about 27 per cent and when the year ends about 125,000 licenses will be in the hands of Bay state operators.

### SUES SUN-LITE GAS CO.

Louisville, Ky., July 16—The Prest-O-Lite Co., Indianapolis, has filed an injunction suit and a demand for an accounting of profits in the United States district court here against the Sun-Lite Gas Co. of Louisville, Thomas F. Hackett, its president; C. A. Tucker, vice-president; J. J. Moran, manager, and Margaret Moran, defendants.

It is set forth that the petitioning firm has spent more than \$1,000,000 advertising its gas tanks for motor cars and its exchange service. In the suit it is claimed that the Louisville firm has been securing and refilling these tanks, thus injuring the business of the Indianapolis concern and getting business for itself to which it is not lawfully entitled.

The defendants will be given until August 3 to answer the suit.

### ST. PAUL PLANT FOR OVERLAND

St. Paul, Minn., July 16—The Willys-Overland Co., Toledo, will erect a branch-factory office building, warehouse and storage yards in St. Paul, costing \$1,000,000. Work will begin in the near future on the plant on University avenue, adjoining the Illinois Steel Co. plant. The company has frontage of about 500 feet, with ample room for expansion. The plant here will assemble and ship cars to all Overland agencies west as far as the Pacific coast.

### MICHELIN CUTS TIRE PRICES

New York, July 17—The Michelin Tire Co. has reduced the price on all its tires 10 per cent. The reduction, according to officials, is due to the greatly increased output of the American plant at Milltown, N. J., which now is supplying orders formerly filled by the European factories.

### STUDEBAKER TO BUY ELKHART PLANT

South Bend, Ind., July 16—The Conn-Musical Instrument factory at Elkhart, Ind., is to be taken over by the Studebakers of South Bend. Colonel G. M. Studebaker and Clement Studebaker, it is stated, have arranged to purchase the property for \$800,000.

# Latest Fashions for the Transcontinental Motor Pilgrim

Boots, Veils and Sport Suit  
Especially Adapted for  
the Woman Tourist  
'Frisco Bound



Motor veil with mask of isinglass that protects wearer's face from dust and wind. Comes in grey, toupe and brown and sells for \$4.50. Shown by Abercrombie & Fitch Co., New York



Twelve-inch motoring boots of calfskin, waterproofed with application of beaver oil. Price, \$10. Shown by Abercrombie & Fitch Co., New York

Transcontinental touring suit of green forester cloth, which can be worn with riding breeches or knickerbockers. The coat is cut norfolk style and is featured by a full belt and large patch pockets. The skirt can be unbuttoned at the front to permit of perfect freedom. Price, \$35. Shown by Abercrombie & Fitch Co., New York



Very smart motoring scarf of heavy silk that can be worn either over the bonnet or thrown about the shoulders. Price, \$10. Shown by Abercrombie & Fitch Co., New York

Woman's tan sport shoe, very serviceable on long motor trips. Price, \$6.75. Shown by Abercrombie & Fitch Co., New York

High motoring boot of calfskin, 16 inches high and waterproof. Price, \$11.50. Shown by Abercrombie & Fitch Co.



# Routes and Touring Information

NORTHERN ENTRANCE TO YELLOWSTONE PARK AT GARDENER, WYO.

## Motorists to Be Held to Stringent Schedules in Yellowstone—Special Regulations Announced for Opening to Cars

At last the inscription over the northern entrance to Yellowstone Park approaches the realm of fact, since August 1 will give "For the Benefit and Enjoyment of the People" a new meaning—under certain regulations. Announcement made several weeks ago that the secretary of the interior would open the Yellowstone to motorists this summer brought cheer to the hearts of the touring public, and those whose 1915 touring itinerary includes America's national playground have been anxiously awaiting publication of rules under which cars are to be allowed entree to the park. Motor Age herewith gives the fundamentals of the regulations just made public by the department of the interior.

### Car Restrictions

Only such cars as are operated for pleasure may enter. Those carrying passengers who are paying, either directly or indirectly, for the use of the machine are barred. Under no conditions are motorcycles allowed. Tickets must be secured at the checking station where the cars enter the park. These tickets must be kept conveniently where they can be shown to park guards on demand, and must be surrendered at the last checking station on leaving the park.

Tickets will show the name of the car owner, license number and state of issue, make of car and manufacturer's number, name of driver, seating capacity of machine and number of passengers.

#### PRICES OF ADMISSION

Runabouts or single-seated cars.	\$5.00
Five-passenger cars .....	7.50
Seven-passenger cars.....	10.00

Careful consideration for the safety of passengers in motor cars, as well as persons on foot, horseback, or in other vehicles, has been given in formulating the rules for speeds, car operation, etc. Motorists will find what amounts to a technical committee that promises to be as diligent in its

work of inspection as are those members of the committees who give racing cars a clean bill of health prior to race meets.

Motor cars while in motion in the park must not be less than 100 yards apart, except for the purpose of passing, which is permissible only on comparatively level stretches, or straight grades. Except when shifting gears, drivers must have their gears constantly inmeshed.

Every motorist must satisfy guards that the car in general, and particularly the brakes, and tires are in good working order and capable of making the trip; also that there is sufficient gasoline in the tank to reach the next place where it may be obtained. Each car must carry two extra tires. Posted notices will designate where gasoline may be purchased.

Muffler cut-outs must be closed when approaching and passing riding horses, horse-drawn vehicles, hotels, camps, or soldier stations. Speed must be limited to 12 miles per hour ascending, and 10 miles per hour descending steep grades and 8 miles per hour when approaching sharp curves.

On good roads with straight stretches, when no team is nearer than 200 yards, speed may be increased to 20 miles per hour. Horns must be sounded at all curves where road can not be seen at least 200 yards ahead and when approaching teams or riding horses.

#### Rule Governs Traffic Passage

Motor cars, regardless of the direction of travel must pass all other traffic on the outer edge of the road, taking care that sufficient room is given on the inside for passage of vehicles and horses. Teams have the right-of-way and cars must be backed, or otherwise handled as may be necessary to allow other traffic to pass with safety.

In no case may a car pass horses on the road at greater speed than 8 miles per hour. Motor cars must keep clear of horse-drawn passenger vehicles, running on regu-

lar schedules, which may be following, and upon overtaking such traffic, if running on schedule, must not pass it, but keep 150 yards in the rear.

Motorists when entering the park will be furnished with a schedule showing times that must be made. For example, cars will leave the Gardiner, or northern, entrance, not earlier than 6 a. m., and not later than 6:30 a. m. for the morning trip. For the afternoon trip cars will leave this entrance not earlier than 2:30 p. m. and not later than 3 p. m. Certain fines will be imposed for arrival at controls earlier than the scheduled time, as follows:

FINES IMPOSED	
50 cents per minute for the first 5 minutes.	
\$1 per minute for the next 20 minutes.	
\$25, or ejection from the park, or both, at discretion of acting superintendent of the park, for being more than 25 minutes early.	

Violation of any of the rules governing motor car traffic will cause revocation of ticket of passage, and aside from the fines mentioned in the foregoing paragraph, will subject the car owner to any damage caused thereby, immediate ejection from the reservation, and be cause for refusal to issue new ticket of passage to the owner without prior sanction in writing from the secretary of the interior.

#### Must Wait for Next Control

When, due to breakdowns or accidents of any other nature, motor cars are unable to reach the next control on time, they must immediately be parked off the road, or where this is impossible, on the outer edge of the road, and wait until the next schedule for motor cars past that point, or until special permission to proceed is given by park guards.

Cars may leave the park by any one of the authorized gates. Drivers are advised to set their watches with clocks at checking stations. Cars stopping over at points other than the hotels and permanent camps

will be allowed to resume travel only at such time as permits them to fall in with subsequent regular motor car schedule past the point of stop-over. Such cars, when stopping, must park 100 yards from the main road.

Due to the high altitude of park roads, power of cars is reduced so that about 50 per cent more gasoline is required than for the same distance at lower altitudes. One

gear lower generally will be necessary on grades than would be necessary in other places. The rules advise close attention be given to engines to guard against overheating.

The rules coming from the secretary of the interior do not apply to motor cars passing over the country road in the northwest corner of the park, en route to Yellowstone, Mont.

## Answers to Inquiries for Routes Information

### St. Louis, Mo.-Brownsville, Tex.

**S. T. LOUIS, MO.**—Editor Motor Age—Kindly give the best route from St. Louis, Mo., to Mercedes or Brownsville, Texas.—W. B. Yost.

From St. Louis, it is a run of 104 miles to Ste. Genevieve, Mo., passing through Maxville, Antonia, Hillsboro, Victoria, De Soto, Bonne Terre, Farmington, Weingarten, over macadam, gravel and dirt roads. Then 64 miles via Perryville, Longtown, Uniontown, Appleton, Fruitland, Jackson, to Cape Girardeau.

Leaving Cape Girardeau, route through Dutztown, Allenville, Aquilla, Bloomfield, Marmaduke, Paragould, Brookland, Jonesboro, Greenfield, Harrisburg, Whitehall, Wynne, Forest City, over dirt, clay and gravel roads.

Between Forest City and Little Rock, Ark., 113 miles, some of the roads are of macadam, but the most part of the road is natural soil, and during wet weather, careful inquiry should be made regarding the passability of same.

From Little Rock, go west to Hot Springs, 53 miles, via Collegeville, Benton, Lonesdale. Then continuing west 348 miles through Arkadelphia, Gurden, Boughton, Emmett, Bonham, Ely, Whitewright, Vandalia, McKinney, Richardson, Dallas.

Going now to Waco, 102 miles, route through Lancaster, Waxahachie, Milford, Hillsboro and Abbott. San Antonio is a run of 215 miles and you should drive through McGregor, Pendleton, Temple, Granger, Georgetown, Austin, Marcos, New Braunfels and Selma.

It is advisable to make local inquiry at the Automobile Club of San Antonio as to the road conditions along the route through Turcotte, Katherine, Rudolph, Yturria, Raymondsville, Lyford, Sebastian, Harlingen, then west through La Feria, to Mercedes, or south from Harlingen, through San Benito, Olmito, to Brownsville.

### Terre Haute, Ind.-Rochester, Mich.

**Hutsonville, Ill.**—Editor Motor Age—Kindly give the best route from Terre Haute, Ind., to Rochester, Mich.—J. B. Cato.

From Terre Haute, Ind., route 70.4 miles to Indianapolis, Ind., passing through Brazil, Harmony, Manhattan, Coatsville, Plainfield. Going next to Fort Wayne, 132 miles, via Muncie, Hartford City, Montpelier, Bluffton. Good stone or gravel all the way.

Driving to Detroit, 164 miles, you should pass through the towns of Hicksville, Byran, Wauseon, Adrian, Tecumseh, Clinton, Ypsilanti and Wayne. This is a good macadam and gravel road with the exception of a short stretch between Seward and Darien, which, however, is excellent in dry weather. From Detroit drive 25 miles to Pontiac, then 11 miles, via Amy, to Rochester, Mich.

### Waltham, Minn.-Fairfield, Ia.

**Waltham, Minn.**—Editor Motor Age—Kindly give the best route from Waltham, Minn., to Fairfield, Ia., via Waterloo and Lone Tree, Iowa.—A. D. Schaefer.

Leaving Waltham, go to Austin, Minn., then 92 miles through Lyle, St. Ansgar, Ia., Plainfield, Erma Station, Waverly, Janesville, to Waterloo. Fair-to-good dirt roads.

elhurst, Beauregard, Brookhaven, Magnolia. Local inquiry should be made from time to time along this route as to the road conditions.

Next pass south through Kentwood, Hammond, Ponchatoula, then east to Covington, and 47 miles north through Bogalusa, Balltown, La., to Camerons Ferry, across Pearl river, then southeast 63 miles, passing through Poplarville, Miss., Vidalia, Cuevas, to Pass Christian. You might make local inquiry at Bogalusa as to a cut-off to Poplarville, avoiding Balltown. From Pass Christian it is a 23-mile run to Biloxi, via Gulfport and Mississippi City.

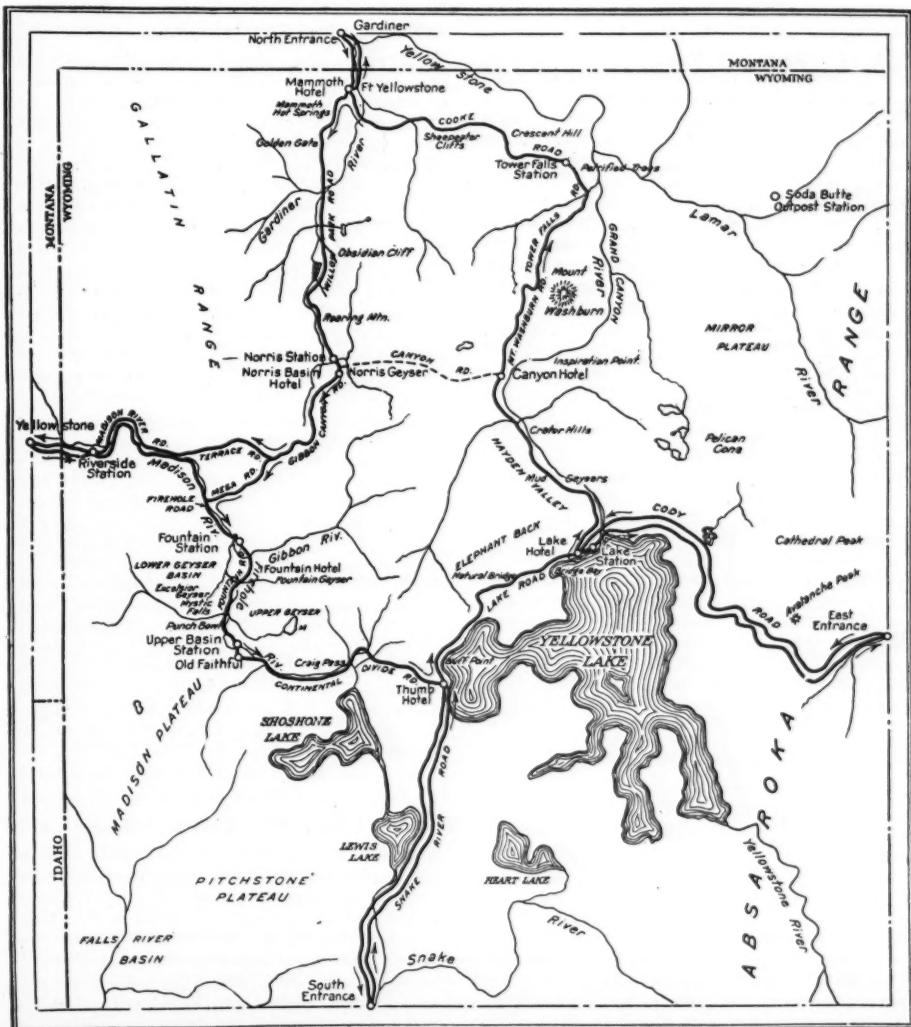
### Sanford, Fla.-Hendersonville, N. C.

**Sanford, Fla.**—Editor Motor Age—Kindly give the best route from Sanford, Fla., to Hendersonville, N. C.—W. C. Hill.

Leaving Sanford, take ferry to Osteen, then to Ormond, via Enterprise, Orange City, DeLand, Daytona, Sea Breeze, 56.3 miles. Next go 88.8 miles to Jacksonville, passing through Bulow, Smiths, St. Augustine, Ft. Marion, South Jacksonville Ferry, ferriage being 15 to 25 cents, car and driver.

Then route west through McCleeny, Sanderson, Olustee, Watertown, Lake City, Houston, Live Oak, Falmouth, Ellaville, Lee, to Valdosta 142 miles; thence to Macon 150 miles, through Mineola, Adel, Tifton, Chula, Sycamore, Sibley, Vienna, Echeconnee, Macon.

From Macon to Atlanta, 97 miles, through Forsyth, Orchard Hill, Griffin, Jonesboro, Atlanta. To Greenville, 188 miles, route via Scottdale, Stone Mountain, Snellville, Au-



MAP SHOWING ENTRANCES TO AND ROADS IN YELLOWSTONE PARK



BEST ROUTE CALIFORNIA, MO.-GLENWOOD, IA.

burn, Jefferson, Pocataligo, Royston, Lavoria, Anderson, Greenville. Then to Hendersonville, 37 miles, via Tuxedo.

An alternate route from Jacksonville would be to go north to Savannah, 177 miles, through Callahan, Kings Ferry, Owens Ferry, Tarboro, Old Sterling, Brunswick, Darien, Riceboro, Freedman's Grove, Savannah. Proceeding to Augusta, Ga., 132 miles, route via Monticello, Rincon, Ardmore, Sylvania, New Sardis, Waynesboro, Augusta. You will have to cover 227 miles to reach Hendersonville, the intermediate points being Batesburg, Lexington, Columbia, S. C., Spring Hill, Newberry, Laurens, Mauldin, Greenville, Hendersonville.

#### Dwight, Ill.-Danville, Ill.

Cardiff, Ill.—Editor Motor Age—Kindly give me the best route from Dwight, Ill., to Danville, Ill. What are road conditions?—William McLean.

Drive 29 miles east to Kankakee over fair-to-good dirt road all the way except a little sand near Kankakee, then south 53 miles to within 1 mile of Paxton, passing through Clifton and Buckley; good dirt and gravel except about 5 miles north of Paxton. Just north of Paxton you will come to a good gravel road leading east into Hooperston, a distance of 23 miles. Turn south again at Hooperston, driving about 30 miles over good road to Danville.

#### Bucyrus, O.-Niagara Falls.

Bucyrus, O.—Editor Motor Age—Kindly give a route from Bucyrus, O., via Cleveland, Buffalo, Niagara Falls, returning by way of Chambersburg, Pa., Hagerstown, Md., and Columbus, O.—B. Ruth.

From Bucyrus, over level country on good gravel or macadam through Broken Sword, Lykens, Bloomville, Republic, Bellevue, Monroeville, Norwalk, Townsend, Wakeman, Oberlin, Elyria, Finney's Corners, to Cleveland, 106 miles. Following the highway along the shore of Lake Erie for 196 miles to Buffalo, drive through Painesville, Unionville, Ashtabula, Con-

neaut, Erie, North East, Westfield, Fredonia, Brant, and Lackawanna. Niagara Falls is but a 26-mile run.

Retrace route to Westfield, then 27 miles to Jamestown, via Hartfield, Point Chautauqua, Bemus Point, Fluvanna. From Jamestown, drive southeast 200 miles through Warren, Kinzua, Bradford, Farmers' Valley, Smethport, Port Allegheny, Coudersport, Brookland, Gaines, Ansonia, Wellsboro, Morris, Nauvoo, Trout Run, to Williamsport, Pa. Then drive 93 miles via Northumberland, following the Susquehanna river all the way to Harrisburg.

Going next to Hagerstown, the towns en route are: Carlisle, Shippensburg, Chambersburg, Greencastle, Pa., Hagerstown, Md.

Proceed westward 127 miles to Uniontown, passing through Clear Spring, Indian Springs, Hancock, Cumberland, Frostburg, Grantsville, Keyser's Ridge, Md., Addison, Pa., Uniontown. Then northwest 83 miles to Wheeling, W. Va., via Balsinger, McClellandtown, Masontown, Khedive, Waynesburg, Rogersville, Rutan, Graysville, Jacktown, Rocklick, Poplar Springs, Moundsville, Glendale, McNechan, Wheeling.

Between Wheeling and Columbus, O., it is best to take the route via Cadiz, Tuscarawas, Coshocton, Newark until the National road is completed between Wheeling and Zanesville. This is a very scenic trip over good hard roads somewhat narrow between Dresden and Hanover, the distance being 153 miles. Then north via Delaware, Marion to Bucyrus.

Complete running directions given in volumes 3 and 4 of the Blue Book.

#### California, Mo.-Glenwood, Ia.

California, Mo.—Editor Motor Age—Kindly give me the best route from California, Mo., to Glenwood, Ia.—Wesley Moore.

Route north out of California to Bonnville, about 25 miles, then turn west 10 miles to La Mine Station. Here bear northwest, going 27 miles via Arrow Rock to Marshall. Here you have an option of two routes to Kansas City, the northern road or Santa Fe trail being a few miles shorter and perhaps slightly better than the more southern route. Leaving Marshall via the northern route, passing Waverly, Dover, Wellington on fair to good dirt or gravel roads with macadam near towns. At Levasy, 10 miles west of Wellington you strike a fine 30-mile stretch of macadam highway into Kansas City.

From Kansas City go north over the Interstate trail, 63 miles to St. Joseph, Mo., passing through Smithville and Dearborn. Follow the poles marked with blue and white bands. This road is mostly dirt but is kept good by dragging.

From St. Joseph route slightly northwest to Marysville, 42 miles, via Savannah. At Marysville it will be necessary to drive about 2 miles north before striking the road west to Tarkio. Caution must be observed during the first 24 miles out of Marysville as there are a number of dangerous culverts. Route through Burlington Junction to Tarkio, where you again turn north going through Shenandoah, Ia., Randolph and Tabor to Glenwood. The total distance from St. Joseph to Glenwood is 138 miles, over natural dirt roads the entire distance.

#### Stevens Point, Wis.-Mobile, Ala.

Stevens Point, Wis.—Editor Motor Age—Please give me the best route from Stevens Point, Wis., to Mobile, Ala.—W. W. Gregory.

Route southeast out of Stevens Point to Waupaca, thence south to Berlin where you should turn east into Oshkosh, then follow the shore of Lake Winnebago to Fond du Lac. From there go southeast through Campbellsport and West Bend to Cedarsburg and on to Milwaukee. Mostly good road all the way.

From Milwaukee route 94 miles south through Racine, Kenosha, Waukegan and Evanston to Chicago. Go next to LaFayette, Ind., over 130 miles of good gravel or stone road all the way except in the immediate vicinity of the Kankakee river bottoms, which is sandy. This road takes you through South Chicago, Hammond, Crown Point, Ind., Rensselaer, Montmorenci. From LaFayette route south through Romney to Crawfordsville, then southeast through Whiteside and Jamestown to Indianapolis. There also is an option out of LaFayette to Indianapolis, via Frankfort, Kirklin and Rosston. This is a good gravel or macadam road.

Next drive to Louisville, Ky., 124 miles, via Columbus and Seymour. Good gravel to Uniontown; mixture of dirt and gravel balance of the way. From Louisville drive 102 miles to Cave City, 10 miles from the Mammoth Cave, via Mt. Washington, New Haven, Buffalo, Bear Wallow, thence to Nashville, Tenn., via Glasgow, Scottsville and Gallatin, 103 miles over fair roads except the last 23 in Kentucky. Route south out of Nashville to Columbia, 41 miles, over fair to good dirt roads. Drive south from there to Decatur, 82 miles, over fairly good roads through Elkmont.

Leave Decatur and go south to Birmingham, Ala., 95 miles, fair-to-good dirt road, through Hartsells, Hanceville, Blount Springs and Artesian Springs. Next drive 112 miles to Montgomery, through Pelham, Montevallo, Clanton, Wetumpka, ferrying the Tallapoosa river 10 miles from Montgomery. Ferryage, 35 cents. Go west to Selma over fair-to-good graded dirt and gravel road, through Prattville and Mulberry, thence southwest to Thomasville, Ala., 77 miles, over fair-to-poor sand and clay road with some rough stretches with stumps in roadway, via Beloit and Shiloh.

At Thomasville turn south and drive 106 miles to Mobile. About one-half of this last leg is graded sand-clay roads, balance fair-to-poor dirt and rough in places.

Volumes 3 and 4 of the Blue Book give running directions.



ROUTE FROM STEVENS POINT, WIS., TO MOBILE, ALA.

# Tourists Hitting All the Trails in Large Volume

Instructions Given by Consul—Women Pathfinders Again on Trip—  
Nevada vs. Adirondacks—Road Comment

FALLON, Nev., July 18—I. H. Kent, local consul for the Lincoln highway, has just written a long letter to G. S. Hoag, of Ely, state consul, stating that the road between Sand Springs and Grimes' ranch, concerning which there has been so much complaint, has been placed in good condition and signboarded. In his letter Kent said that westbound tourists should stop at Sand Springs and ask for instructions as to the best road to take across the flat, as the question as to which road is best depends entirely upon weather conditions.

Travel over the Lincoln highway is increasing every day. Every few hours a party of eastern tourists pass through Fallon. The hotel men, merchants and restaurant proprietors have noticed the increase in travel and regret that they did not heed the complaints of the motorists before. They now know that they have lost considerable business.

### ILLINOIS PARTY IN BILLINGS

Billings, Mont., July 19—W. W. Lindsey and J. H. Wells, of Aurora, Ill., stopped in Billings a few hours early this week while on their way to Seattle by motor. They reported excellent roads the whole distance, with the exception of a short stretch through South Dakota. They had encountered no engine trouble in the entire 2,000 miles traveled and the tires had the original Illinois ozone with which they started. They are averaging close to 200 miles per day.

### 'FRISCO TO MACON, ILL., IN 14½ DAYS

Macon, Ill., July 19—From Los Angeles, Cal., to Macon, Ill., by motor in the remarkable time of 14½ days, goes to the credit of John Gundy and his two sons. This is believed to be the quickest run ever recorded by a resident of this section of the state. The distance is 2,865 miles and the Gundy average was 198 miles per day. Their best run was 285 miles in 24 hours. The consumption of gasoline totaled 315 gallons while they expended \$9 for lubricating oil. There was no tire trouble of consequence. They had but two punctures. They selected the Santa Fe trail and had no regrets. The road was good except in some places in the mountains and in the desert of Arizona.

### WOMEN PIONEERS RETRACE STEPS

Reno, Nev., July 16—W. Atwood and wife, W. D. Lewis and wife, Mrs. Martha Ramsey, and Harold Leonard, chauffeur, were members of a party which stopped in Reno for one day recently, while on their way to San Francisco from Hackensack, N. J. Mr. and Mrs. Atwood drove a

Maxwell, the other members of the party traveling in a six-cylinder Chevrolet. Mrs. Atwood and Mrs. Lewis are pioneers of the Lincoln highway, having made the same trip with two other women 6 years ago by motor.

They were more than agreeably surprised by the many changes and improvements accomplished along the route in the last 6 months. On their trip 6 years ago they endured real hardships on account of the lack of proper sleeping accommodations for tourists, and poor food, but on the present trip they say they have lived as well as they could at home. They hardly found a ranch where they couldn't get what they needed—even some motor supplies. The most noticeable improvement is in the condition of the roads, they said.

### CROSSES COUNTRY IN 27 DAYS

Los Angeles, Cal., July 17—Mrs. Al. Woods of New York is in Los Angeles after driving across the continent via the National Old Trails highway in a Pierce-Arrow. Mrs. Woods drove from New York to this city in 27 days. While on the Pacific coast the New York woman motorist intends to visit the exposition at both San Diego and San Francisco in addition to visiting practically every point of interest in California accessible to motor travel.

### HIGHWAY IMPROVEMENTS NOTED

Detroit, Mich., July 17—President H. B. Joy, of the Lincoln Highway Association, who has recently completed a trip over the highway from Detroit to the Pacific coast, states that the improvement since his last inspection of the route in 1913 has been tremendous. In every state he crossed, hundreds of workmen were encountered dragging, grading, widening and straightening the Lincoln highway. "It is impossible to enumerate the points where work is going on," said Mr. Joy; "it is only possible to remember the few points where actual improvement is not now in progress."

### EULOGIZES WESTERN ROADS

Austin, Nev., July 17—Miss Emma Marburg, of Baltimore, sister of America's ambassador to Belgium, passed through Austin this week in a twelve-cylinder Packard, accompanied by Mrs. Sarah Gibbon, W. J. Eller, Dr. W. L. Norris and William Nummert, all of Baltimore. Miss Marburg was on her way to the exposition. She has traveled all over the world in motor cars, and while here she said she thought the trip over the western part of the United States had proved the most in-

teresting of all her tours. She has picked up the well-known phrase of "an empire in the making," and used it here in speaking of the west. Since leaving home the party has made stops at Gettysburg, Chicago, Omaha and Salt Lake City.

### MT. WHITNEY MOTOR ROAD

Bakersfield, Cal., July 15—America's highest peak, Mt. Whitney, in southern California, is to be conquered by the motor car. A highway is to be built to the summit, 14,501 feet above sea level.

The Los Angeles Chamber of Commerce, state board of control, state highway commission, state forestry service, Kern county board of trade, Los Angeles county highway commission and the Automobile Club of Southern California have all united in the determination that the road to the summit of Mt. Whitney will be begun as soon as possible.

Details of feasibility have been carefully considered and August 1 a party led by state and county officials will leave Bakersfield to make the first preliminary surveys.

Mt. Whitney is the roof of America. The new "Angel Trail to the Clouds" will lead directly from this city to the summit, from where a clear and unobstructed view can be had into Death valley, America's cellar, the floor of which is 280 feet below sea level.

### 100 TOURING PARTIES A WEEK

Des Moines, Ia., July 19—Registers for touring visitors are kept by leading garages of the city and the record for last week shows that over 100 touring parties, many bound from the east to the west coast, passed through the city. Good roads generally were reported and many travelers were enthusiastic over the River-to-River road, which seems to be the favorite cross-state highway.

### MANY TOURISTS AT RENO

Reno, Nev., July 17—Many parties are stopping over in Reno, both those going to the fairs and those returning to the east.

Registered were Mr. and Mrs. W. T. Curan, and Mr. and Mrs. J. Merk, of Oak Park, Ill.; Walter Dalbey, Weehawken, N. J.; Harry Kennedy, N. Y.; A. W. Saline and wife, St. Paul; Dr. C. S. Kerr, Emlenton, Pa.; John Calvin, Alvin Michael and L. Peterbaugh, Eau Claire, Mich.; and F. Sheibe, of Boston, all of whom stopped at the Lincoln garage and are on their way either home or to the exposition.

At one garage there were eleven trans-

continental tourist parties using Studebaker cars housed during the week. Among them was a party of nine traveling in three cars, one of the machines being used for bedding and camping equipment. They started from Ohio the middle of June and traveled over the Lincoln highway, finding it an excellent road with one or two exceptions. In the party were George M. Reider, wife and two children, Mr. and Mrs. William Ross, Mr. and Mrs. J. McIven and George Gray. Others at a local garage during the week, were: Mr. and Mrs. Hapgood, Omaha; George Morse and S. T. Morgan, Santa Cruz, Cal.; George H. Pine, Boston; Mr. and Mrs. A. M. Millward, Salt Lake City; Frank E. Graham and W. E. Miller, Decatur, Ill.; Lincoln M. Price, Ed Meyers and Alvin Pittman, of Ogden, Utah.

Work on the Idaho Central highway has been completed to the Nevada state line, according to Charles E. Wiseman, of Idaho Falls, who, with Mrs. Wiseman, passed through here in his machine for the exposition.

D. Burdick and wife, R. Snow, and the Misses Bessie Burke and Mabel Hawes, all of Cheyenne, traveled westward over the Lincoln highway to Ogden, taking the overland trail at that place. They report the Overland trail in good condition.

Mr. and Mrs. D. Hirschberg and two daughters of Providence, R. I., visited a day in Reno during the week.

## Lawyer, Banker and Sportsman Meet

### Exchange Information Gained Through Actual Experiences—Volume of Touring Shown

CHICAGO, July 19—Coincidences are found in touring as well as elsewhere and an evidence of this was seen today when two tourists from the west and one from the east met in the offices of Motor Age. J. G. Lowe, president of the Farmers' Bank, Kearney, Neb., and H. C. Andrew, attorney, Kearney, Neb., came in to inquire as to the best roads to New York, while John R. Bradley, of New York, hunter of big game, sportsman and globetrotter, called to ask concerning Lincoln highway conditions west of Chicago.

It so happened that the Kearney party was able to give Mr. Bradley first-hand information of actual conditions west, while the same favor was extended by Mr. Bradley as to roads east. Mr. Andrews and Mr. Lowe, with their wives, found the Lincoln highway west of Chicago in good shape for driving and encountered no bad stretches. Mr. Bradley, who, with his wife and his chauffeur, is driving a Simplex across the continent, found conditions between Chicago and New York good with the exception of a stretch from South Bend to Chicago, via La Porte, Ind.

Mr. Bradley, who has crossed Siberia in

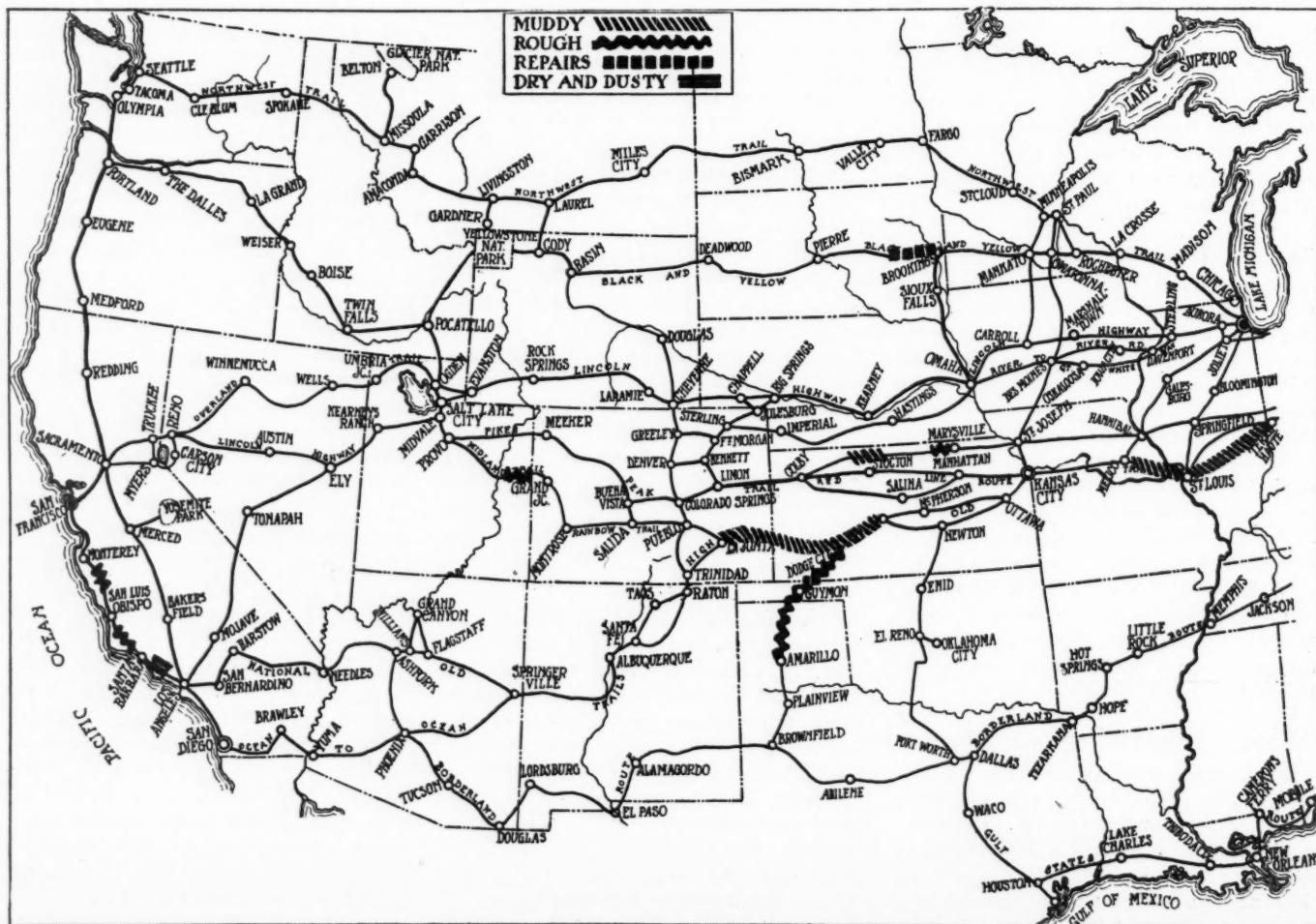
various kinds of conveyances, ranging from motor cars to wagons, ponies and camels; headed an expedition in the wilds of Africa; shot big game in Alaska; killed polar bear in the Hudson Bay country and traveled with Dr. Cook in the ship bearing his name as far north as Cook could go by boat, says he has roughed it sufficiently that the present trip is mere child play. He will drive the Lincoln highway to Cheyenne, then go to the Yellowstone, Glacier National Park, Seattle, down the Pacific highway to San Francisco.

#### TOURING VOLUME COMPARED

A comparison of the volume of touring over the National Old Trails through Springerville, Ariz., for the last four seasons shows the following number of cars:

1912 .....	113
1913 .....	194
1914 .....	419*
1915, including July 12 .....	500

\* To July 11, 1914, 151 cars out of this total had passed.



VISUALIZING ROAD CONDITIONS AS TOLD ON OPPOSITE PAGE

# Straight Tips on Transcontinental Trails

*Latest Reports on Road Conditions from Those Who Know*



## HOT OFF THE WIRE

*Colorado Springs, Colo., July 21—Special telegram—Despite general heavy rains in middle states, Pike's Peak Ocean-to-Ocean highway is passable all the way from St. Joseph to Salt Lake City, due largely to its location on divide and not parallel to large rivers. Considerable travel is moving in both directions. Roads in mountains good.—A. W. Henderson.*

*Huron, S. D., July 20—Special telegram—Tourists arriving from Wisconsin and Iowa points report Black and Yellow trail in good condition except where repairs are being made between here and Iroquois. Period of excessive rainfall now past and can expect good condition of trail from now on. Dragging and graveling results in evidence all along the line.—Bowes Garage.*

**BILLINGS, MONT.** .... July 18—Reports coming from every county in Montana through which the Yellowstone trail and National Old Parks highway passes indicate that roads are in excellent condition. Motorists who have driven from Billings to the Yellowstone say the Bridger canyon stretch now is in fine condition and that the whole distance is almost equal to asphalt. On account of the altitude and the soil formation the roads are dry in 1 day after a rain.—R. C. Wright.

**ADAIR, IA.** .... July 18—Heavy rains have had little effect on the Great White Way from Des Moines to Davenport. A recent trip over this road proved that there are no bad places. With the exception of  $\frac{1}{4}$  mile east of Letts, where there is a little sand, fast time can be made. This route is marked and is the best across the state. From Des Moines to Omaha road is good, considering heavy rains. Between Des Moines and Van Meter and between Casey and Adair, where repairs are being made, detours are unnecessary.—Roy A. Stacey, Secretary, Great White Way Association of Iowa, Inc.

**DODGE CITY, KAN.** .... July 18—To La Junta, generally good, though recent rains have made part of the way muddy. The surface dries quickly after rains. To Great Bend, mostly good, but some bad mudholes. Detours have been arranged. To Amarillo, dry but rough. There is a new bridge over Cimarron river near Liberal. Bad places on these roads are being repaired and detours have been planned during reconstruction.—C. H. McCollom, Santa Fe Trail Garage.

**SEDALIA, MO.** .... July 17—Road to Kansas City good. One-third is rock, balance well dragged dirt. Only a little worse for recent rains.—Paul V. McAninch.

**BROOKINGS, S. D.** .... July 16—Black and Yellow trail through Mankato, Minn., and Pierre, S. D., has some sections under repair; balance good. Worst places between Brookings and Arlington.—A. E. Bundy.

**ST. LOUIS, MO.** .... July 16—Road to Kansas City mostly good. Between High Hill and Columbia there is a stretch of mud and tourists should route via Mexico to avoid this. Red Ball route to Keokuk very bad. Heavy mud all the way and very rough. To Terre Haute, passable, but local inquiry should be made as to detours around muddy places. Tourists are making these roads, but find the places mentioned hard to negotiate. Heavy rains for any length of time would render them all impassable.—Matthew F. Morse, Secretary, Automobile Club of St. Louis.

**FLAGSTAFF, ARIZ.** .... July 16—Road west through Holbrook and Kingman and branch roads are good.—Babbitt Brothers.

**GRAND JUNCTION, COLO.** .... July 16—Dry weather continues between Continental Divide and Salt Lake City. Road good, except one stretch of 9 miles in Grand county, Utah, which is rough. This is caused by wagon freight hauling.—L. Antles, Secretary, Chamber of Commerce.

**BOONE, IA.** .... July 17—Lincoln highway through here is good, well graded; bridges and hills in good shape. Good gravel construction keeps these roads from showing much effect from rain.—W. C. Crowe.

**LOS ANGELES, CAL.** .... July 17—Conditions in Foxen Canyon are such that it is advisable to take the Los Alamos road from Los Olivos and Los Alamos. This is the best road to Santa Maria and offers a saving in mileage. Road is rough north of Santa Maria through Nipomo and Los Arros to Arroyo Grande. From the latter the state highway through Pismo Beach to San Luis Obispo is good. It is advisable to take the Memefee Valley road when driving via the Inland route until temporary road signs have been placed on the Elsinore road. These signs will be placed in the near future.—Automobile Club of Southern California.

**SAN DIEGO, CAL.** .... July 17—Tourists should take the Laguna Beach road to Los Angeles, as the highway south of El Toro is very rough and dusty. At Verdugo creek it is necessary to make a long detour, which offers some bad grades and is extremely rough and dusty, but is the only way cars can travel at present. Construction is under way near Laguna and another detour must be made, but conditions over detour are better.—Automobile Club of Southern California.

**KEARNEY, NEB.** .... July 19—Road to Omaha, Lincoln and Julesburg are good and should continue so, as they have had ample time to dry.—Wort & Minton.

**SEATTLE, WASH.** .... July 17—To Kelso, Wash., good. Pacific highway through Oregon in good shape. New road just built over the Siskiyou mountains from Ashland, Ore., to Coles on the Oregon-California line. Maximum 7 per cent grade. Coles to Hornbrook road narrow down long hill—difficult to pass other vehicles coming from opposite direction. Holbrook to Delta good with exception of 18-mile stretch of new construction. Delta to Redding, via Kennett, narrow but good. Road on to San Francisco, via Sacramento valley, good.—Automobile Club of Seattle.

**EMPORIA, KAN.** .... July 17—To Kansas City good. To Hutchinson there are a few mudholes, but these should be O. K. in a few days if it does not rain again.—Newton Brothers.

**COLORADO SPRINGS, COLO.** .... July 19—Pike's Peak highway through Kansas is in better condition than at any time heretofore this year. From Phillipsburg to Norton impossible to keep well dragged; some mud, but road can be negotiated. All of the road west of Kansas is first-class.—Pike's Peak Ocean to Ocean Highway Association.

# The Readers' Clearing House

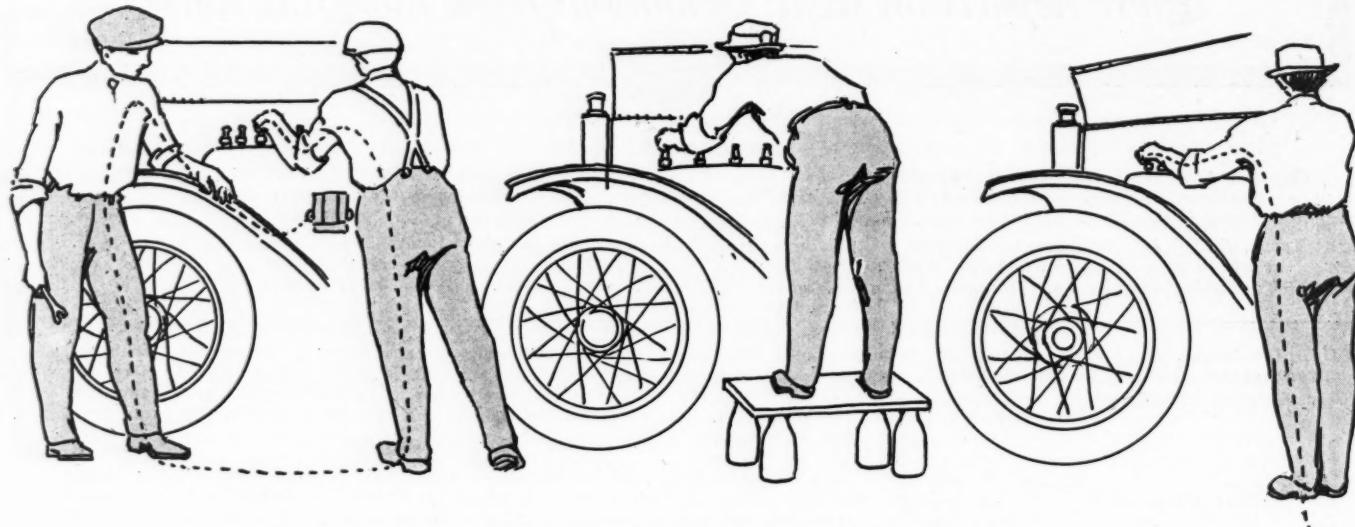


FIG. 1—WHEN AND WHY YOU RECEIVE A SHOCK WHEN YOU TOUCH A SPARK PLUG

At the left is shown one man touching a plug when the motor is running and another man touching a fender. In this case both men receive a shock because the current can complete the circuit shown by the dotted line. In the middle view a man is standing on a board mounted on four bottles and in this case no shock is felt when a live plug is touched. In the right view one man is standing on the ground and touching a plug and he receives a shock because of the earth's enormous capacity for current.

#### ACTION OF SPARK PLUG IS SHOCKING

#### Why Person Touching High-Tension Cable

#### Feels Current

CINCINNATI, O.—Editor Motor Age—I note an inquiry in Motor Age of June 10 from F. C. Appley, Libertyville, Ill., who is troubled with starting a hot Ford engine. I have been trying to figure out his hot engine proposition for 3 years and while the condition is easy enough to overcome, I have not been able to figure out the cause. When the engine is good and hot, say after a 20-mile run and a stop is made, if the switch is thrown off, there will be trouble in starting if the attempt is made within 20 or 30 minutes. The remedy I have found effective in this case is to put the spark lever in any position from horizontal up and open the throttle lever to its fullest extent. Then spin the engine. After one or two revolutions, one cylinder will take hold quickly followed by the rest and by the time you can get around and close the throttle, all four will be hitting properly. The hot engine can be stopped so that in a few minutes it will start with normal cranking. In stopping, momentarily speed up the engine, throw off the switch and immediately throw the throttle wide open. The momentum will suck in a good charge of gas and the hot engine will then start on a quarter pull. It certainly is a gas proposition and in my case does not appear to have any connection with rich or lean mixtures as I have experimented with both. It does have something to do with the quantity of gas admitted on stopping. If it was an over-rich mixture, why did the engine run properly at all speed just before it was stopped and again just after it was started? When I make a country run and average 27 or 28 miles per gallon, I have to thin my mixture down so that the engine only fires when running 10 miles per hour and up, and I can cause this hot engine trouble or not, depending on whether I leave the cylinders on stopping, with a full supply or a meager supply of gas. I have unlocked my carburetor adjustment on the dash and change it with my foot whenever conditions warrant it—richening when I come up behind a street car discharging passengers or when I have to accelerate on a hill, and thinning down when I can see a few blocks of clear running ahead.

My car is a 1912 model and I use the warm air intake from around the exhaust manifold with which the motor originally was equipped. Some people remove this warm air intake during the summer months. I take it that if a carburetor float was gaslogged the carburetor would overflow, due to the check valve not working. If Mr. Appley is sure that it is not a retarded spark nor a slipping fan belt that causes his overheating, there are a great variety of causes, such as dragging brake shoes, dragging clutch bands, tight connecting rod

or crankshaft bearings, poor lubricating oil, one cylinder misfiring, carbon in cylinders, a radiator in which hard water has been used and which has a thin coating of mineral substance on the inside of the tubes, thus preventing proper radiation, a low water level due to a leak near the top of the radiator, a radiator with some of the tubes plugged up, as well as the over-rich mixture you mention. Loaded with baggage, I have traveled the Berkshire Hills in western Massachusetts on high gear and also the southern Illinois black mud roads before they had dried out after a rain and have not had overheating trouble.

2—Here is a question that no one has ever answered to my satisfaction. How is it possible to stand 6 inches at least from any part of the body of a car and be able to get a powerful shock from the spark plug terminal while the engine is running? The car is insulated from the ground by means of the wooden wheels and the rubber tires and no part except the hand need touch the machine in order to get a good one from the high-tension terminal. Just how is the ground connection made?—Russell B. Hopkins.

1—Ford motors, like electricity, often act so peculiarly that the results cannot be explained, but in your case it appears to be, as Motor Age stated previously, one of a rich mixture. When you open the

throttle just before stopping it is true that the motor sucks in an explosive charge. This it would not do at very slow speed, for the reason that, at that speed, the mixture is too rich. When running along at 25 miles per hour the motor receives a fairly good running mixture because of the additional air passing through the carburetor, but when the motor is shut down with the throttle closed, it sucks in a rich charge, instead of a more diluted one, and this causes the hard starting. You can easily prove this by starting the engine when it is hot, with the needle valve so turned that only a small amount of gas is fed.

All Ford magnetos do not show the same characteristics, nor do all owners use the same spark plug gap in all plugs and these things should receive consideration.

2—This is due to the earth's immense capacity for electricity. When one person, standing on the ground near the car, touches a high-tension lead with one hand the extremely high-voltage current passes from the lead through the person's body and is dissipated in the earth, which acts as a negative. The current never returns to the magneto and cannot, unless the earth is shorted. If a connection is made between the earth and the car then the current will avoid the earth as a ground and pass back to the magneto. This easily is proved by having one person touch some part of the car while another touches a spark plug. The current then will pass from the plug through one person to the earth and then, through the other person, back to the magneto as shown in Fig. 1.

If the experimenter will insulate himself

#### Questions Answered and Communications Received

Russell B. Hopkins	Cincinnati, O.
F. V. Ruckman	Providence, Ky.
Reader	Lima, O.
Clarence Cobb	Allegan, Mich.
A. Z. Dolen	Franklin, Ind.
O. M. Finch	New Boston, Ill.
Reader	Charles City, Ia.
Modax Owain	Pleasureville, Ky.
Joseph J. Mather	Springboro, Pa.
M. Nelson	Brandon, S. D.
G. E. Tackett	Colome, S. D.
A. Subscriber	Carmi, Ill.
M. E. Sensenbrenner	Wittenberg, Wis.
E. L. Woerner	Indianapolis, Ind.
C. M. Dobyns	Oberlin, O.
Roby Mercantile Co.	Roby, Tex.
George Mallers	Detroit, Mich.
G. E. Scobie	E. St. Louis, Ill.
R. A. Champlin	Clinton, Ia.

No communications not signed with the writer's name and address will be answered.

entirely from the earth and then touch a high-tension lead, no shock will be felt after the body has been charged completely. This charging may cause a slight shock to be felt for a short period only. This can be done, as shown in the illustration in Fig. 1. Take four quart milk bottles or other glass objects of the proper size and place a board over them, as shown. Then stand on the board and touch a spark plug.

It should be remembered that the rubber tires act as insulators, making the car a ground in itself, but when a person makes a connection from a high-tension lead to ground, the extremely high capacity of the earth to absorb electricity causes the current to avoid the car's ground.

Additional proof that the earth absorbs the current which is suppose to return to the magneto may be had by the following experiments.

Remove one of the spark plugs and place it upon an iron bar which is resting on the ground. Connect the plug, by means of a cable, with one of the terminals on the magneto distributor as shown in Fig. 2. Pour a little water all around the iron bar, so as to make a good ground connection. Then start the motor and you will see a small spark jump the gap in the plug.

Another interesting test which proves that the current goes to the earth and never returns to the magneto may be made by removing the magneto from the motor and insulating it completely by means of a rubber covering. Place the magneto on a bench and drive the armature by means of a pulley with an insulated stand as shown in Fig. 3. Attach a cable from a distributor terminal to a spark plug resting upon an iron bar and when the magneto armature revolves a spark will jump the plug gap.

#### CLEAN WATER JACKETS WITH SODA May Be Introduced Under Pressure—Effect of Two Sets of Plugs

Providence, Ky.—Editor Motor Age—What is a good method for cleaning out radiators

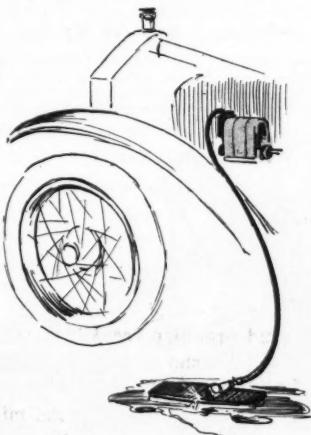


FIG. 2—SPARK WITH NO RETURN

A wire is run from the magneto to a spark plug resting upon a piece of metal. When the magneto is turning over a spark will jump the gap even though there is no return to the magneto, for the same reason as stated under Fig. 1

and also the water jackets of the cylinders? 2—Would a two-spark magneto make any improvement in the speed of a four-cylinder T-head motor?

3—What harm can result from using graphite in the gearset? Instruction book for my car says if this is used the car is removed from the guarantee?

4—In starting motor on magneto by hand crank, it will not start with spark fully retarded. It is necessary to advance spark about one-quarter. Does this indicate anything wrong with magneto?—F. V. Ruckman.

1—Water jackets and radiators may be cleaned by introducing, under pressure, a saturated solution of washing soda in water.

2—There would be a slight increase by the use of two sets of spark plugs firing at once.

3—Graphite is a good lubricant, but the ordinary form is not as good for gears as graphite preparations, which have the consistency of ordinary gear oil.

4—No. When starting on the magneto it is necessary to advance the spark about one-half or more.

#### FORD LARGEST BUILDER IN U. S. A. Other Factories Which Probably Are Among the First Ten

Franklin, Ind.—Editor Motor Age—In the ratio of actual production, what are the ten largest manufacturers of cars in the United States? Also state their annual production, number of men employed by each, square feet of floor surface in each factory.

2—Speaking generally, has the car, which is manufactured entirely or practically entirely by one manufacturer, any better lasting qualities than the assembled car?

3—What kind of piston rings are used in the present Overland cars? What type in Buick? In Studebaker? In Reo?

4—Has the anti-leak ring any advantage over the old type?

5—Is it not true that disregarding size or piston displacement that the most powerful motors which have ever been built have been T-head motors?

6—In general which motor has shown greater gasoline economy and power for its size, the overhead valve motor or Knight motor?

7—Do car owners who own overhead valve motors experience more valve trouble than those who own T-head or L-head motors? Also do they not have to be ground oftener?—A. Z. Dolen.

1—The ten largest builders of passenger cars in this country probably are as follows and while the Ford company comes first Motor Age is making no attempt to grade the others. Ford, Overland, Buick, Studebaker, Maxwell, Cadillac, Reo, Hudson, Chalmers and Dodge.

There are no accurate statistics regarding the number of men employed by each factory and this information together with the other you wish is best obtained directly from the concerns mentioned.

2—The question cannot be answered.

3—The Overland uses ordinary diagonally-split ring, the Buick a step-joint ring, the Reo an anti-leak type and Studebaker the ordinary variety.

4—The anti-leak type of ring is better than the ordinary diagonally-split type when it comes to preventing leakage of mixture and oil past the piston.

5—In motor car practice the fastest and most powerful motors are of the valve-in-the-head type and Motor Age is inclined to believe this holds true outside the motor car field.

6—No tests have been conducted with a view to making comparisons as to fuel economy and power.

7—In some types of valve-in-the-head

motors the exhaust valves become pitted more rapidly than do the valves of a T or L-head motor, and hence grinding is necessary oftener. In general the owners of valve-in-the-head motored cars experience no more valve trouble than do the owners of other cars.

#### MOTOR FIRES ON TWO NOT ON FOUR End Plugs Will Spark When the Others Are Short-Circuited

Allegan, Mich.—Editor Motor Age—I have a Krit car which will not hit regularly when idling or running fast on smooth road. It will fire all right on a hard pull slowed down. The compression is good. It has a good spark and the two center cylinders fire all right but the end ones misfire. If I short the two center ones the end ones will fire, if I short the center ones will fire. Adjusting the carburetor does no good. The spark plugs in the end cylinders dirty up some while the two center plugs are clean. Carburetor is a Stromberg.—Clarence Cobb.

The only apparent cause of this peculiar action is due to some disarrangement in the interrupter housing. The interrupter is broken by one cam for cylinders Nos. 1 and 4 and by another cam for cylinders Nos. 2 and 3, and it is possible that the points break well on one side and not on the other. When the end plugs are shorted the condenser action causes the two middle ones to obtain sufficient current to fire the charge. There are a number of causes of uneven breaking of the points and Motor Age does not advise you to try to dismantle the magneto to find the cause. Send the magneto to the nearest service station and have them look it over.

#### Jay-Eye-See An Outlaw Car

Lima, O.—Editor Motor Age—Why is Disbrow's Jay-Eye-See not mentioned as entered in any of the races during the last year?

2—Kindly inform me as to the racing ability of Harry Agerton? Has he ever established any notable records or is he just an amateur?

3—Are Pennsylvania vacuum cup tires any good for racing? Did not Wilcox use two on his Stutz in the Vanderbilt cup race?—A. Reader.

1—Disbrow's Jay-Eye-See not only is too large to compete in any of the speedway races, but the car is being used in unsanctioned meets, thus barring it from competition in A. A. A. races.

2—The man you mentioned is not a

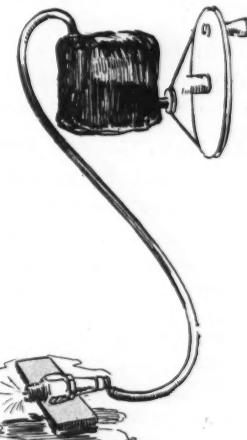


FIG. 3—ANOTHER PLUG EXPERIMENT

The magneto is insulated by means of a rubber bag. When the armature is revolved a spark will jump the gap in the plug which is resting on a piece of metal. The current never returns to the magneto but goes to the earth

prominent race driver and does not hold any A. A. A. records.

3—Motor Age does not know how vacuum cup tires would perform in racing. Wilcox used Silvertown cord tires in the Vanderbilt.

**REDESIGNED 1913 FORD ROADSTER**  
Installed Streamline Hood and New Fenders and Windshield

Pleasureville, Ky.—Editor Motor Age—In Fig. 4 is shown a 1913 Ford model T which I rebuilt. I rebuilt the windshield by using two sets of locks, the same as the ones used on the shield as it comes. I made the upright supports out of  $\frac{3}{4}$ -inch soft steel. I put the lower panel of old shield at the top, cut 3 inches off upper panel and used it at the bottom, giving unobstructed vision through the top. To make the cowl, I made a frame to fit to the top of the body, using instrument board about  $3\frac{1}{2}$  inches wide. I covered same with 22-gauge steel. I made running boards out of oak 9 inches wide 45 inches long and covered with pyramid aluminum. Bumper is made from  $1\frac{1}{4}$ -inch channel iron.

When I rebuilt the machine I overhauled the motor and found the pistons and connecting rods combined weighed the following: 53 ounces, 55 ounces, 58 ounces, 59 ounces. I had to rivet small plates to the lightest two, having two ounces difference in order to bring up the weight. With an Atwater-Kent ignition, my car is noiseless and can take moderate hills in high 6 miles per hour. I bought the following equipment and accessories, which came ready to put on: Hayes fenders, Superior lamps, 17-inch steering wheel from Motor Car Supply Co., Chicago; Fedder's radiator, Gray & Davis lamps, seat covers from Perkins Campbell, ignition, Atwater Kent, Pyramid aluminum from Andrew Cow & Co., Louisville, Ky.

I also removed first, second and seventh leaf from the rear spring, top leaf from front, using cushion insert between the leaves. I found all the accessories through Motor Age advertisements. My necessary mechanical expense has consisted of one radius rod at \$2.50 and about 30 cents' worth of felt for the rear axle, in which I use heavy oil and about one-quarter graphite, instead of grease.—Modax Owan.

**BUICK 16 REBUILT BY ITS OWNER**  
Runs Quietly and Looks Like Modern Type Roadster

Springboro, Pa.—Editor Motor Age—I have been very much interested in some of the recent articles in Motor Age on rebuilt cars, and in Fig. 5 show a car which I rebuilt and remodeled from a touring car.

This car was originally a model 16 Buick, built in 1910. I did not remove the front seat, but took off the rear seat and built an entirely new body. In building the body I made a skeleton, same as is used in the factories, and made the body of an artificial wood manufactured by a firm in Michigan. This wood, when heated to 180

degrees, can be bent in any curve necessary in building a body, and when cool, hardens so that, after being given a coat or filler and five or six coats of rough stuff, it takes as fine a finish as any material used in bodies. The body is painted a medium lake, with black molding, black running gears and French gray wheels.

I installed an electric lighting system, put on a one-piece windshield, with instrument board, new rear fenders and horn. The space back of the seat is inclosed for tool box, storage batteries, extra tubes, etc.

The motor used in this model is of the overhead type and was noisy. To improve this, I remodeled the valve lifting mechanism and installed different universal magneto connection, with the result that the car runs as quietly as most of the new cars.

All parts that showed wear I replaced with new ones and I have a car that gives me as good service as a new car, looks up to date, and counting the cost, which did not exceed \$200, I consider it much better to remodel an old car if it is a good one, than to sacrifice it at the low prices paid for second-hand cars.—Joseph J. Mather.

**ADVANTAGES OF OVERHEAD VALVES**  
Main Features of Motor with One Set in Head Other in Side

Brandon, S. D.—Editor Motor Age—Has the Reo engine any advantage by having the intake valve in the head?

2—Is it harder to hold the steering wheel steady on a 1915 Reo than on an Overland model 80?

3—Are any of the racing cars equipped with gear and sector steering gears?

4—Which has the advantage, a car which pushes through the springs or one which pushes through the torsion tube?

5—Has the Reo any advantage over the Overland as to position of gearset?

6—What speed can be attained with a 1915 Reo four with top and windshield down?—M. Nelson.

1—The loss of heat through the cylinder walls of a motor depends to a large extent upon the wall surface area and by placing one valve in the head the surface is reduced, compared with the average L-head or T-head motor, because of the absence of one valve pocket. This tends to give more power. Also large inlet valve may be used when only one set is in the head, and the mechanism is simpler than if both valves were in the head.

2—This depends upon the driver.

3—Motor Age has no record of the type

of steering post used on various racing cars.

4—Both methods of propulsion are in use today, and which one is the better is a question as yet undecided.

5—An article on the advantages and disadvantages of gearset location appeared in this department in the April 8 issue of Motor Age.

6—A good average figure for this car is 45 miles per hour.

**KNOCKS WHEN PULLING SLOWLY**  
Overloading Any Motor May Cause Misfiring and Bucking

Colome, S. D.—Editor Motor Age—Kindly give the reason for the engine of a Buick C-25, 1915 model, knocking on high gear while pulling hard or on high gear when running at a speed of from 5 to 8 miles. This car pulls well on high and low gear, but seems to have no power on intermediate. How can this be remedied?

2—Will more mileage or better results be obtained by mixing high grade and low grade gasoline?

3—How can the rattling of the clutch band on this car be prevented? I have been unable to find any adjustment on same.—G. E. Tackett.

1—Any motor may knock if it is required to pull a heavy load when the spark is advanced too far. As soon as the motor starts to knock, retard the spark, or shift into second speed. Perhaps the carburetor is so adjusted that the motor will not throttle down to 5 miles per hour, with the result that the engine misfires and bucking results. Have the carburetor adjustments checked up.

You do not say whether the motor shows lack of power on second speed when used on level or grade. The trouble may be caused by overloading of the carburetor.

2—Many garages sell gasoline which is a mixture, so further mixture makes matters worse. It does not pay to do this.

3—Motor Age does not know what you mean by a clutch band rattle.

**Maker of Alloyanum**

Carmi, Ill.—Editor Motor Age—Where may Alloyanum pistons be obtained?

2—Kindly give the cost of same in proportion to size.—A Subscriber.

1—These may be obtained of Harry Miller, Los Angeles, Cal.

2—Write to the maker for prices.

**Rebuilding Car for Racing**

Charles City, Ia.—Editor Motor Age—I would like some information on oils. I have two racing cars but have bearing trouble. Do they all use castor oil or half and half?

Fig. 4—How a reader redesigned a 1913 Ford car



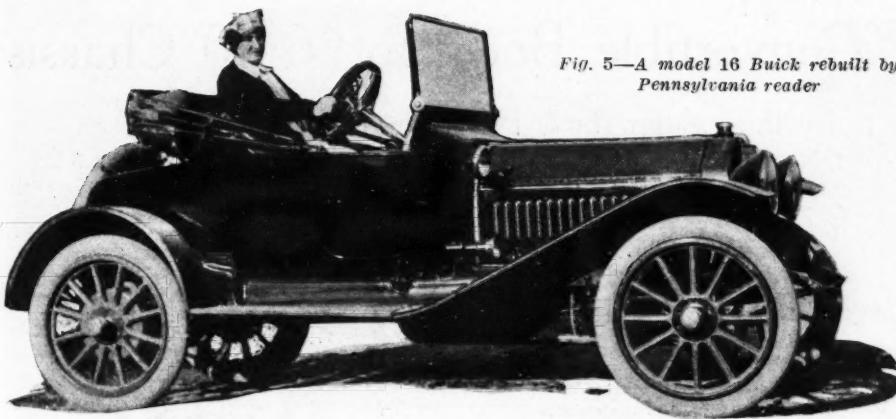


Fig. 5—A model 16 Buick rebuilt by Pennsylvania reader

2—I am remodeling a Stutz into a racer. It is a 1912 four-passenger, gear ratio 3 to 1. Will it be necessary to use light pistons and connecting rods? Will it pull a higher gear ratio. I want it for a  $\frac{1}{2}$ -mile track.—Reader.

1—Some drivers use castor oil and others special oils which are mixtures of castor oil and some mineral oil.

2—The use of lighter pistons and rods will increase the motor speed.

The car can be fitted with a higher ratio than 3 to 1, but it is not wise to get too high a ratio for  $\frac{1}{2}$ -mile dirt track work.

#### SIZE OF THE BLITZEN BENZ MOTOR

It Has Four Cylinders, 7.28 by 7.87 Inches

—Driven by Bob Burman

E. St. Louis, Ill.—Editor Motor Age—Who owns the Blitzen Benz?

2—Kindly give the size of the motor and valves.

3—What factories have racing teams?

4—Does the Blitzen Benz hold the world's record? Give the time.—G. J. Scobie.

1—The Blitzen Benz which Burman drove now is owned by E. A. Moross who is using it for barn-storming.

2—The motor is a four-cylinder, 7.28 by 7.87. Motor Age does not know the valve sizes.

3—At the present time there are only three American motor car factories with a team in the field. These are the Mercer, Stutz and F. R. P. companies. The Maxwell company, which up to this time has had three cars in various races, has quit the sport.

4—The Blitzen Benz holds the American record for 1 mile, which was driven at the rate of 141.7 miles per hour by Bob Burman.

#### MOTOR HAS DEVELOPED A KNOCK Believes it is a Piston Slap Caused by Loose Rings

Indianapolis, Ind.—Editor Motor Age—I put anti-leak rings on the middle grooves of my pistons on a Ford car, and I now have what several repairmen call a piston slap. This was not apparent before changing rings. These rings consist of four narrow rings to a groove. The salesman of whom I purchased the rings said I could not put them on the top groove because they would come off when the pistons are at the top. I could not see the top groove when the pistons are up, and do not believe the rings would come out. The rings are stiffer than plain rings. My connecting rod bearings are tight. Are these rings the cause of the slap? Car has been run 5,000 miles.

2—Can I put them on the top groove?

3—Will they score the cylinders?

4—Will three sets of these rings on each piston cause excessive wear or lubrication trouble? With plenty of oil in crankcase, no smoke comes from exhaust.

5—Would Motor Age advise over-size pistons?

6—Should I remove these rings?—E. L. Woerner.

1—It is possible that the new rings are smaller than the old ones and allow the piston more freedom sideways, thus causing slapping.

2—Yes.

3—They will, if they are fitted too tightly.

4—It is better to use only two sets, although three, properly fitted, will be alright. Do not fit the rings tightly in the cylinder, otherwise lubrication difficulties may come up.

5—Motor Age does not advise you to fit oversize pistons if the cause of the trouble is elsewhere.

6—Before attempting to tear the motor down partly or altogether, Motor Age suggests you have the engine examined by one of the technical men at the Ford assembly plant in your city. It may be that a knock has developed which really is not a piston slap, although the sound may be the same as one.

#### CARBURETER CAUSES WHISTLING Result of Air Striking Sharp Edge of Air Valve

Detroit, Mich.—Editor Motor Age—I have a 1912 Mitchell equipped with a model H Holley carburetor. This car was recently overhauled and everything is in perfect condition, nevertheless I do not get more than 12 miles to a gallon of gasoline. Advancing the throttle more than half causes a whistling sound in the carburetor and the increased speed is hardly noticeable.

2—Where can replacement parts for the Mercedes be obtained in this country?

3—Does Motor Age think there will be any marketing of used and old European motor cars in this country at the close of the war?—George Mallers.

1—You should be highly satisfied with the showing the car is giving. The whistling probably is caused by the in-rushing air acting against the side of the air valve.

2—These may be obtained of the Paul La Croix Automobile Co., 1770 Broadway, New York.

3—No.

#### MAKER OF MERCEDES AND BUGATTI Former Made by Daimler Company— Symptoms of Weak Magnets

Wittenberg, Wis.—Editor Motor Age—Who manufactures the Mercedes car which de Palma drives, and what is its horsepower?

2—Will Barney Oldfield drive a Bugatti at the Elgin races in August? What is the horsepower of the car, and by whom is it manufactured?

3—What effect would weak magneto have on a Ford motor and how can one tell that the magneto are weak?

4—What would be the effect of fastening the

ground wires to the platinum screw, and attaching the platinum screw wire to the ground on a Remy dual system, and what effect would it have on the motor?—M. E. Sensenbrenner.

1—Mercedes cars are made by the Daimler Motoren Gesellschaft, Stuttgart, Germany. The exact horsepower of de Palma's car is not known, but it develops somewhere in the neighborhood of 125.

2—Oldfield will not drive a Bugatti. The Bugatti is made by the Construction d'Automobiles, à Molsheim, Alsace, Germany. Motor Age does not know its horsepower rating.

3—Usually the first indication of weak magnets is misfiring at low speeds. When the magnets are weak starting on the magneto is quite difficult owing to low current generation when the motor is cranked. If the magnets are very weak the motor may stop if the throttle is closed too much.

4—You would cut out the points and the magneto would not give a spark.

#### HOW TO INCREASE MOTOR POWER Suggestions for Tuning Up Engine for Speed Work

Oberlin, O.—Editor Motor Age—What speed could be obtained from a Ford with the following changes: Paca streamline racing body, no fenders, V-radiator, Splitdorf high-tension magneto, Schebler carburetor, wire wheels, gear ratio  $2\frac{1}{2}$  to 1?

2—What other changes could be made to increase the speed?—C. M. Dobyns.

1—It is impossible to foretell what speed increase would be obtained with the changes you mention.

2—You can obtain a material speed increase by using lighter pistons and rods in the motor. Some have used Magnalium, others Lynite, both of which are aluminum alloys. If you will glance through the classified columns of Motor Age you will see a number of advertisers make a business of installing such parts. Larger inlet valves can be installed and a larger carburetor fitted, both changes tending to give more power. It also is suggested that you use a double-distributer magneto.

#### Cylinder Uses Too Much Oil

Roby, Tex.—Editor Motor Age—We recently purchased a new Ford touring car. Cylinders Nos. 1, 2 and 4 seem to fire and lubricate perfectly, while No. 3 feeds too much lubricating oil and every 15 or 20 miles it is necessary to either clean or change the spark plug.

Will Motor Age kindly tell us how to overcome this trouble?—Roby Mercantile Co.

The third cylinder probably uses too much oil because the piston rings are badly worn or the piston is too loose. This would allow oil to make its way to the combustion chamber and in this way foul the plugs frequently. Try lowering the oil level slightly and if this does not help you will have to remove the piston and fit new rings or get a new piston.

#### Ignition Used on Buick

Clinton, Ia.—Is it correct to say that a 1914 Buick has a magneto with the Delco system or is this just a low-tension generator with storage battery ignition?—R. A. Champlin.

The 1914 Buicks are not fitted with a magneto, but use battery ignition. The ignition distributer is mounted on the motor-generator shaft and is fed by the storage battery or by dry cells for emergency.

# Chalmers Has New Convertible Body for 6-40 Chassis

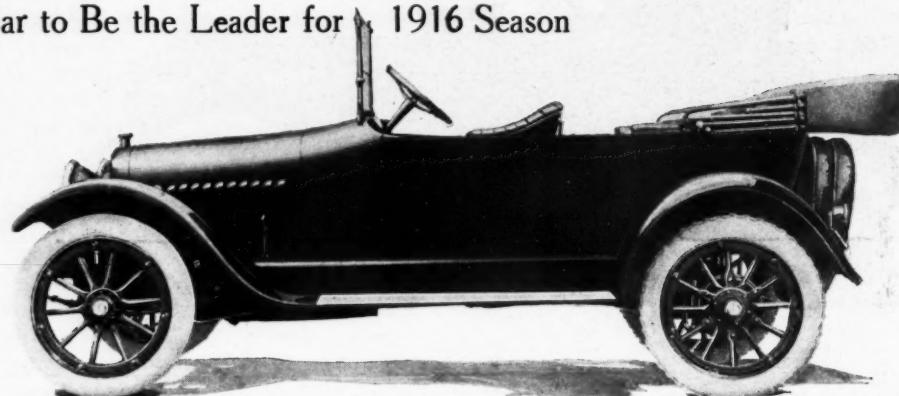
This Car to Be the Leader for 1916 Season

THE Chalmers Motor Co., Detroit, Mich., will have three cars for 1916, and of these the six-40 will be the principal product. The six-48 and the Master six will be continued, but it is not anticipated that there will be so large a demand for these as for the smaller car. Of the six-40 there will be two types, five-passenger and seven-passenger, the latter having 4 inches more wheelbase and semi-elliptic rear springs instead of cantilevers as used on the five-passenger. These two models are priced \$1,275 and \$1,350, respectively. The six-48, which is of different design, costs \$1,550 with a seven-passenger body, and the Master six \$2,175, with touring body.

A new body is being developed for the six-40, which may be converted into a standard open touring car or a sedan and the attachment of the upper works is made in an ingenious and secure manner. Whether the car is open or closed, there is nothing to show that it is convertible and in the closed condition the appearance is handsome. This new body is not yet in production, but will be available later on.

#### Chalmers Six-40 Chassis

Coming back to the six-40 chassis, the unique feature of the motor is that the overhead camshaft is driven at its center by a large worm gear and to obtain a similar drive at the center of the crankshaft, the middle bearing is divided into halves. This makes a four-bearing shaft and it is remarkable that it has been possible to get the middle bearings of such good width. Having dimensions of 3.125 by 5, the motor is intended for high-speed work, so great rigidity of crankshaft and crankcase were desired. The former has been obtained by using a 2.25-inch shaft and the latter by very rigid webwork around the center bearing supports, and the use of a box form of crankcase with sides that come much lower than usual.



CHALMERS MODEL 6-40 WHICH WILL BE THE PRINCIPAL CAR THE DETROIT CONCERN WILL MARKET FOR 1916

This type of case is not uncommon where the bearings are put in endwise, being first mounted on the shaft, but it requires considerable ingenuity to arrange them as they are in the Chalmers so that they can be scraped in with the shaft in its proper place.

#### Overhead-Valve Motor

The cylinder block consists of three portions, the lower is the part in which the pistons work and is a simple casting. On this rests the head casting, which carries the camshaft, the valves and the spark plugs, while on top of all is an aluminum cover. Two features of great convenience to the driver are the positions of the ignition distributor and the oil filler, since both these parts are above the top cover, as can be seen in the photographs. Oil is poured into the camshaft case, where some small part of it remains, and the overflow passes down the space surrounding the camshaft driveshaft to the base.

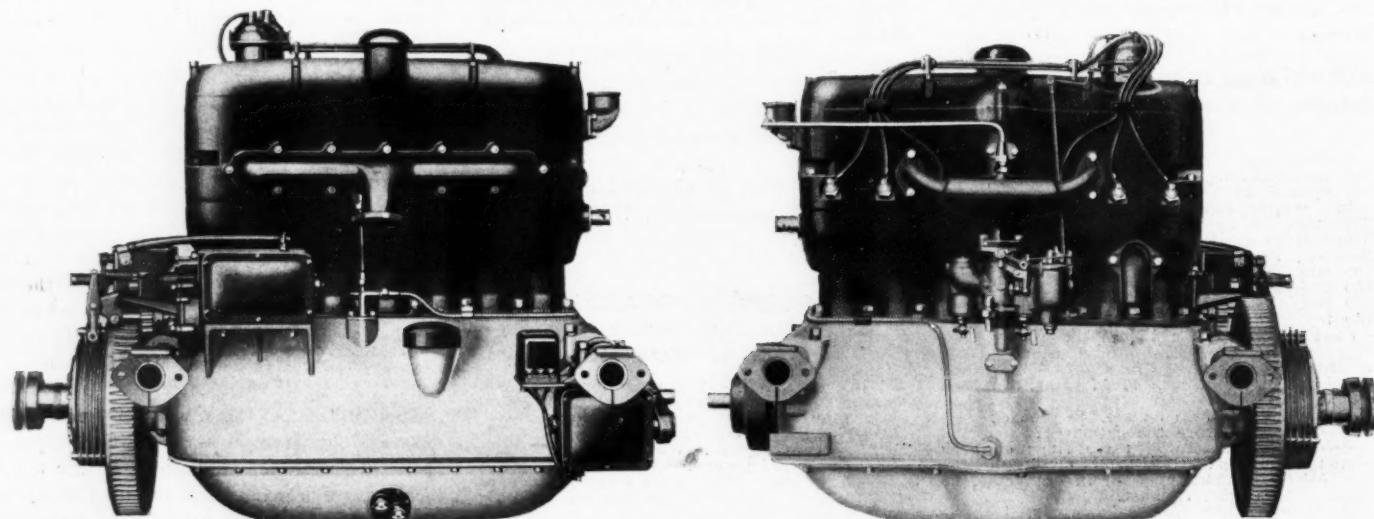
With an overhead valve motor, and an overhead camshaft also, lubrication is liable to be troublesome, because enough oil must be pumped to the top and yet the supply to the camshaft kept down sufficiently to prevent flooding the valves them-

selves. In the Chalmers motor, the cam-shaft is hollow and a small hole is drilled through each cam; at the center there is a supply for the spiral gear and holes for the supply to each bearing. Oil is pumped to the front-end bearing direct, and thence passes along the shaft, but the size of the outlets prevents too much lubricant reaching the valve compartment. Sundry gutters serve to catch what little drip there is and conduct the oil back to the shaft tunnel, whence it returns to the crankcase. For the crankshaft there is a supply to each main bearing, all the oil leads being copper pipes and dip troughs are used for lubricating the connecting rod bearings. Splash cases for the pistons in the usual way.

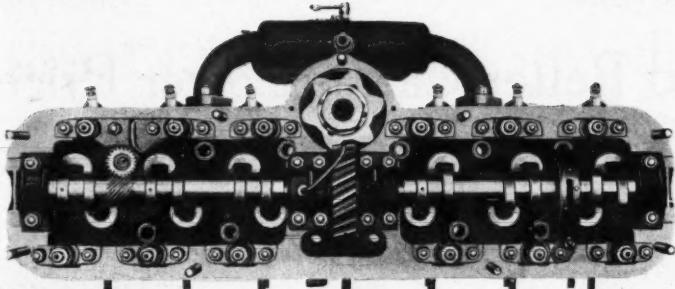
#### Vertical Shaft Has Double Duty

The same vertical shaft which drives the camshaft is used for the oil pump drive, as the pump is mounted directly beneath it and connected by a short, jointed shaft that allows the pump to be taken off for cleaning without disturbing other parts.

Having all the valve gear on top of the motor means that the generator and starting motor can be put in any convenient place alongside, without interference with



LEFT AND RIGHT SIDES OF CHALMERS 6-40 MOTOR, SHOWING CLEAN DESIGN AND JUDICIOUS POSITIONING OF FITTINGS



*Above, overhead cam-shaft construction on Chalmers 6-40. Right, motor view showing oiling system.*

other parts. Thus, instead of the starting motor being low down and almost in the mud pan, as it sometimes has to be, it is carried high up on a bracket on the crankcase side. There are, of course, several bearings and joints in the mechanism which slides the pinion into mesh with the flywheel rim gear, and the high placing of the motor makes these points very easy of access.

A very simple and yet completely effective means for adjusting the generator drive chain is employed, this being made possible by the method of support for the motor. In the crankcase are two large holes, one at each end, running transversely right through the aluminum, and steel tubes are put through these holes to form the crankcase arms. The Gray & Davis generator is hung just beneath the right-hand end of the front tube, where it is sufficiently accessible for all purposes, and the bracket which holds it is gripped to the crankcase supporting tube by a clamp screw. The drive chain is outside the crankcase, so, by slackening the clamp screw and gently tapping the bracket along the tube, the chain can be brought to any desired tension and held there by a turn of the clamp. The whole operation of adjustment can be performed very easily and quickly.

#### Transmission Details

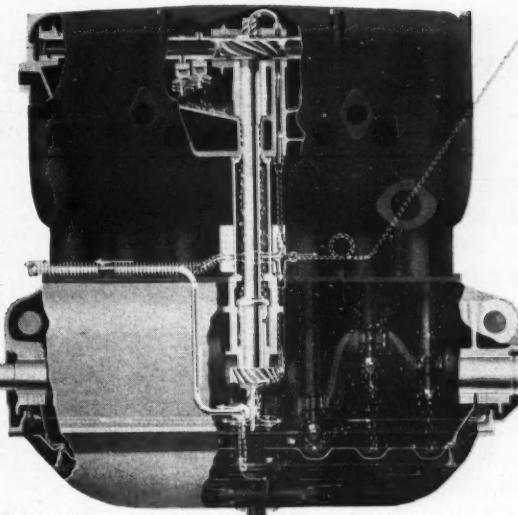
Back of the motor is a simple form of dry-plate clutch with a light action and then comes the short double universal to which the front end of the driveshaft attaches. The Chalmers company pins its faith to the rear-axle gearset so that the chassis divides into but three main assemblies, the motor, the gearset and the frame with springs and front axle. To cut the unsprung weight, a carefully designed aluminum gearbox is used and another point which should be mentioned is that the gear shifting rods are laid out on such centers

that rough roads and high speed combined have no tendency to throw the gear shift lever to and fro.

It is not easy to describe a car like the Chalmers, which is designed and made in its own factory, without running to great length, so having considered the main units of the chassis the others may be hastened over a little. Firstly, the brake rods and links are arranged to have a straight pull and the levers are well proportioned, so that plenty of arresting power is available without heavy pedal pressure. Special pains are taken to make the steering free and precise.

There is a substantial support towards the middle of the cantilever spring, also long shackle, which permits free action at the front. Putting the middle spring support under the frame instead of alongside it removes all twisting stresses on the side rail and saves weight in the brackets and attachments. In a short demonstration run over a particularly vile piece of sand road near the Chalmers factory it could be noticed that there was very little tendency for the car to plunge, even with the rear seats unoccupied, and incidentally the same run showed the ability of the motor to pull smoothly on high gear through fairly heavy going.

Naturally, one would expect plenty of high gear ability with a 5.25 to 1 ratio, but a good deal of vibration round about 30 miles an hour would also be anticipated and this most certainly does not occur even



at speeds a good deal above this. The Rayfield carburetor suits the motor well and provides a very good acceleration, a couple of trials on a brick road showing from 5 to 30 miles per hour on high gear in between 14 and 15 seconds.

The touring bodies have almost straight line sides and the high hood makes the car look powerful. Ample leg room and upholstery, deep enough to give the soft feeling of a good arm chair, combined with careful finish, are the principal characteristics. Tires are 34 by 4, and there is one spare demountable rim.

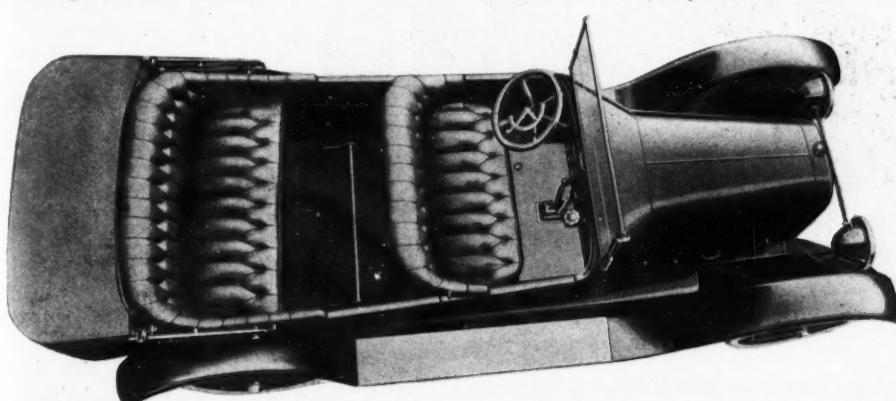
#### SEVEN KISSEL TRUCKS FOR 1916

Hartford, Wis., July 21—A new 1,000-pound delivery wagon added to the line of the Kissel Motor Car Co. brings its commercial vehicle chassis to seven, as follows: 1,000-pound,  $\frac{3}{4}$ -ton, 1-ton,  $1\frac{1}{2}$ -ton, 2-ton,  $2\frac{1}{2}$ -ton, 3-ton,  $3\frac{1}{2}$ -ton, 4-ton and 6-ton. The new truck has a 115-inch wheelbase and uses the model 32 motor, which is a block design made in the concern's own shops. The drive is by David-Brown worm gearing.

#### BELL CO. TO HAVE A TRUCK

York, Pa., July 20—Announcement is made by the Bell Motor Car Co., York's latest addition to the motor car industry, that the company will have on the market by September 1 a 1,200-pound delivery car. The car will be built on the same chassis as the touring car. There will be two prices, with and without electric lights and electric cranker. The former figure will be about \$775, the price of the touring car and roadster. The delivery car will be equipped with a Bosch magneto instead of the Atwater Kent system, as used on the passenger cars. It also will have a lower gear ratio. The bodies will be built at the plant of the York Body Mfg. Co., operated by the Bell company.

The first Bell car was completed and appeared on the streets last week. The new Bell car is built in two models, a touring car and a roomy roadster, the price of either being \$775. The car has a 112-inch wheelbase and uses Hotchkiss drive.



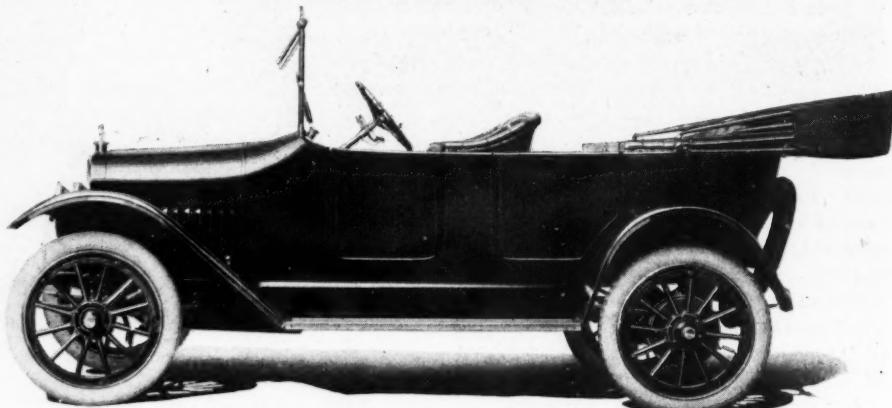
*VIEW OF CHALMERS 6-40, SHOWING SEATING ARRANGEMENT*

# Maxwell for 1916 Larger and Better Car at Lower Price

## Touring Model Now \$655 with Electrical Equipment

### WHAT MAXWELL OFFERS FOR 1916 SEASON

Roadster, \$635, touring \$655  
New design, narrow radiator  
Cone clutch now runs in oil  
Clutch and flywheel inclosed  
Change in oiling system  
Oil gauge on crankcase  
New breather and oil filler  
Electrical wiring made simpler  
Demountable rims instead of clincher



MAXWELL 1916 FIVE-PASSENGER TOURING CAR.

*The refinements made in this car all tend to added comfort for the passengers and with the changes, a price reduction of \$95 has been made*

**G**REATLY improved appearance, due to the fitting of a new shape radiator and a larger hood, larger body and a number of refinements in motor and body construction have come to the 1916 Maxwell, which is revealed to the public this week at \$655 as a touring car and \$635 in roadster form. These prices are with full electrical equipment for starting and lighting, and as the 1915 Maxwells sold for \$750 and \$725, respectively, when electrically started and lighted, the new prices are really big reductions.

#### Car Larger and Lines Better

Still built upon the chassis of 103 inches wheelbase, the new Maxwells reflect credit to the designers who have developed so pleasing an appearance and so finished a

look to the cars. The radiator is somewhat narrower and higher than before, and the front edges have been rounded over, while the top is given a very slight bulge, with a suggestion of a taper. This, together with the raising of the hood and the new shape of the front of the body where it meets the hood give the car a larger look and a more consistent line.

In the power plant there have been several changes. The clutch and flywheel are inclosed instead of the former construction, whereby there was a yoke passing around the open flywheel and supporting the gear-set. The present method of housing these units completely is similar to general practice, where unit power plant design is followed, but an entirely new feature is the running of the cone clutch in oil. The housing is designed to be oil tight, and thus the clutch is constantly bathed in the lubricant. This has been done to make

a smooth engaging feature, eliminating any grabbing ten-

dency, as the oil serves to cushion the engagement.

In the Maxwell design of clutch, a woven asbestos fabric is used as a facing for the cone, thus the oil does not harm it in any way. It is probable that leather could not be used with an oil bath of this kind. A slightly heavier clutch spring is used with the new construction. But this is so slightly heavier that its action is not noticeably stiffer. The cone is now made of cast aluminum instead of pressed steel, so that the unit really is lighter than before.

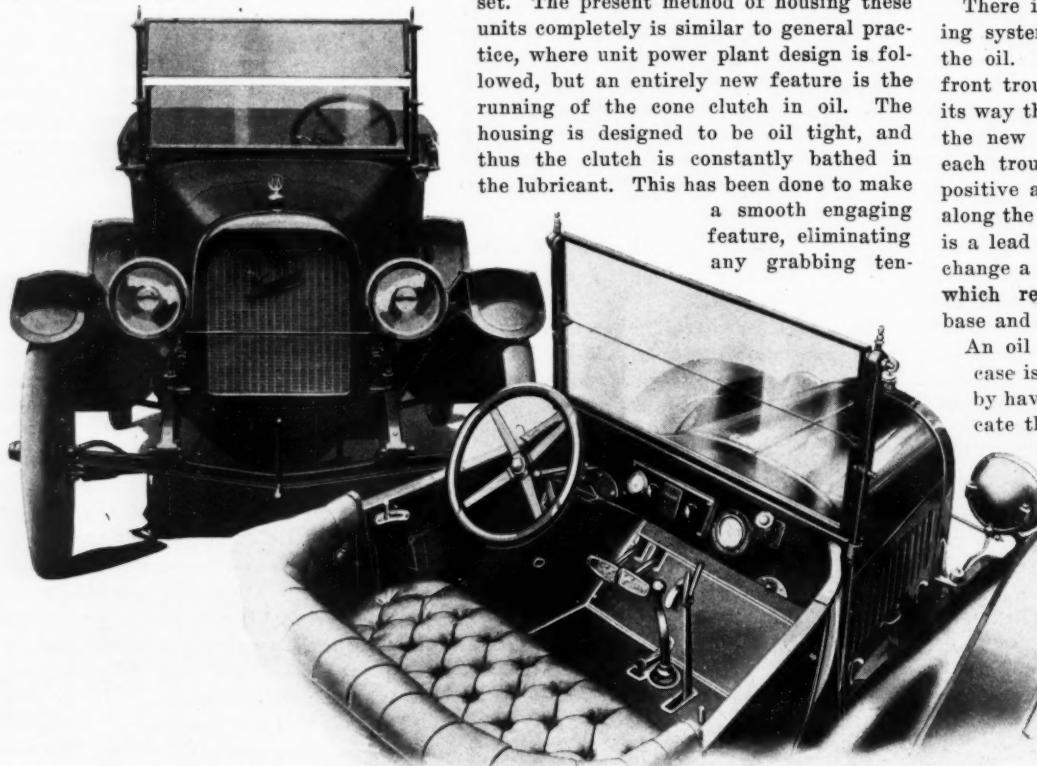
#### Slight Change in Oiling System

There is some change in the splash oiling system in the method of distributing the oil. Instead of introducing it at the front trough, and then allowing it to find its way through ducts to the other troughs, the new method is to introduce oil into each trough individually, making a more positive arrangement. A supply pipe runs along the inside of the crankcase and there is a lead to each trough. Along with this change a new aluminum base now is fitted, which replaces the former pressed-steel base and acts as the reservoir.

An oil gauge on the side of the crankcase is another new fitting. It operates by having a float-controlled pointer indicate the level of oil in the case.

Another refinement is the fitting of a combination breather and oil filler on the left side. Although this breathes downward, the filling is from the top, and hence any oil that might be thrown out from the crankcase is sent to the drip pan instead of spraying over the engine.

The engine is of the detachable-head type, and an im-



TWO VIEWS OF THE 1916 MAXWELL

*Above, the front view showing the new radiator and the headlights bracketed to the fenders. At the right, a view showing the dash arrangement and control members.*

proved form of head is fitted. It is split higher up and makes a very simple design so far as removal is concerned. It carries the water outlet connection as an integral part.

Reviewing the general features of the Maxwell power plant, the motor retains its bore of 3 $\frac{1}{2}$  and stroke of 4 $\frac{1}{2}$ . The dimensions give a displacement of 185.8 cubic inches and the stroke-bore ratio is 1.24.

#### Simms-Huff System Retained

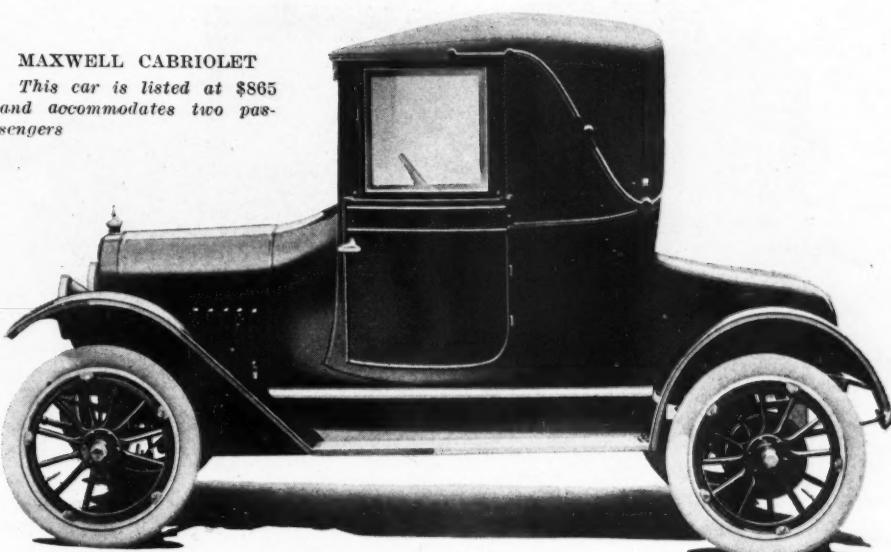
Cylinders and upper part of crankcase are integral, making for a rigid construction. Valves and manifolding are on the right, as is also the Simms high-tension magneto. The two-bearing crankshaft seems exceptionally large for the engine. Two bearings support the camshaft also and the front gears are spiral bevels.

Installation of the Simms-Huff motor-generator for starting and lighting is the same as employed on the majority of the motors of the 1915 model. The unit is carried on the right rear of the engine, and the one difference is in the complete housing of the gearing which connects with the flywheel for starting.

In principle, the combined unit is the same as usually employed. Driven as a generator, it is run by a shaft, but as a motor it gears with flywheel teeth. Operating on 12 volts the motor turns an average engine at about 100 r. p. m., although this will vary slightly. Drive for the generator shaft is by a belt, which runs over three pulleys. The driving pulley is placed on the outward extension of the magneto shaft, and it passes over the fan pulley as well as the generator shaft pulley. Tension is kept constant in the belt by a spiral spring attached to the arm which carries the fan and its shaft and pulley. This bracket is carried by the cylinder head, and the spring holds the pulley up against the belt with sufficient force to maintain a good drive for both fan and generator with little or no slip. It makes a practically noiseless assembly.

In connection with the electrical system there is a commendable refinement in the method of connecting wires that have to go on the body with those on the chassis. A junction plug beneath the front compartment floor boards makes a simple method of attaching body and chassis wires. Should it be

**MAXWELL CABRIOLET**  
*This car is listed at \$865 and accommodates two passengers*



necessary to take off the body, all that has to be done to the wiring is to disconnect the terminal block, when the body is entirely free so far as the wiring is concerned. Only those wires which have to go up to the electrical control box in the instrument board are on the body. The storage battery is hung amidships of the frame on two cross members.

#### Drive System Unaltered

There is no change in the drive system. The drive shaft is inclosed within a torsion tube and there is a universal at the front end just back of the three-speed gearbox. The shaft connects to the three-quarter floating rear axle, which incorporates five Hyatt spiral-roller bearings in its construction. There is one bearing under each wheel, one carrying the pinion and one on either side of the differential unit. Ball thrust bearings are used in conjunction with the Hyatts in the latter three positions. The axle shafts are of nickel-steel and are housed in tubes of seamless steel, which rivet to the malleable iron differential housing. An axle ratio of 3 $\frac{1}{2}$  to 1 is used.

Springing is continued as in 1915, with three-quarter elliptic rear springs measuring 40 inches in length and front springs 32 inches. The rear pair are fixed at the front to transmit the drive and attach to the axle on a rocking seat, this giving unrestricted action.

By tapering the frame, it gives good support to the body along the entire length, the rear width being 33 $\frac{1}{8}$  inches as compared with 28 inches at the front. There are three cross members.

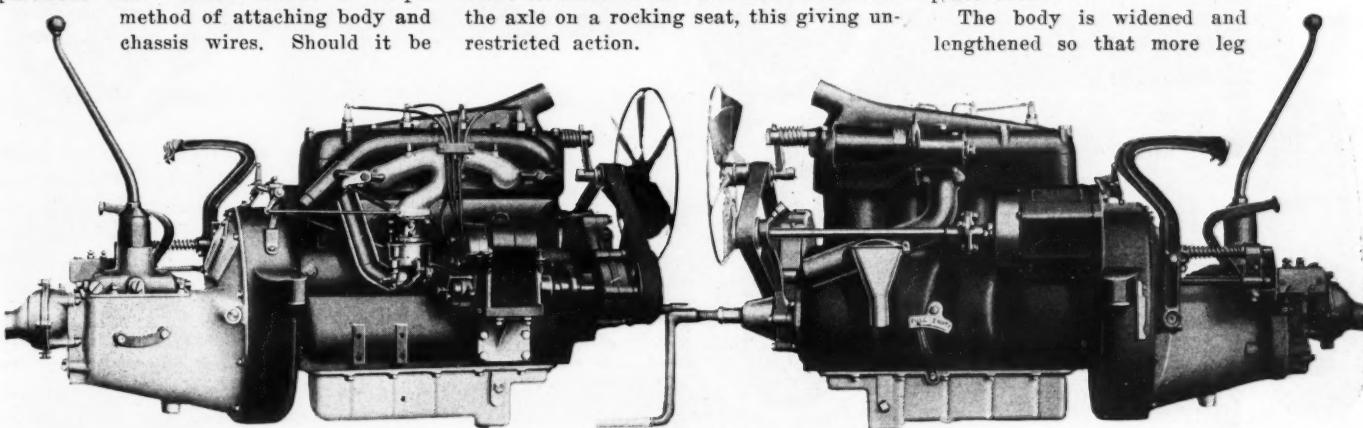
Tires are 30 by 3 $\frac{1}{2}$  with non-skids in the rear. A new feature on the 1916 cars is the use of demountable rims instead of the straight clincher type.

Turning to the outward changes, perhaps chief among these is the change to aluminum-covered running boards instead of corrugated metal. On the floor of the front compartment, linoleum is also used in place of the rubber matting of 1915. Non-rustable metal strips hold down the edges of this new covering.

#### Better Headlight Supports Used

More rigid supporting of the headlights is secured by bracketing them to the fenders instead of by vertical supports from the frame. A noticeable change is the fitting of a well-arranged instrument board with speedometer and gauges set flush with its surface in contrast with the former protruding attaching. The electrical connections are all brought to one unit, which is removable so as to readily reach the terminals. In the center of this unit there is a plate held by a spring. This exposes the fuses, making it very convenient to replace them.

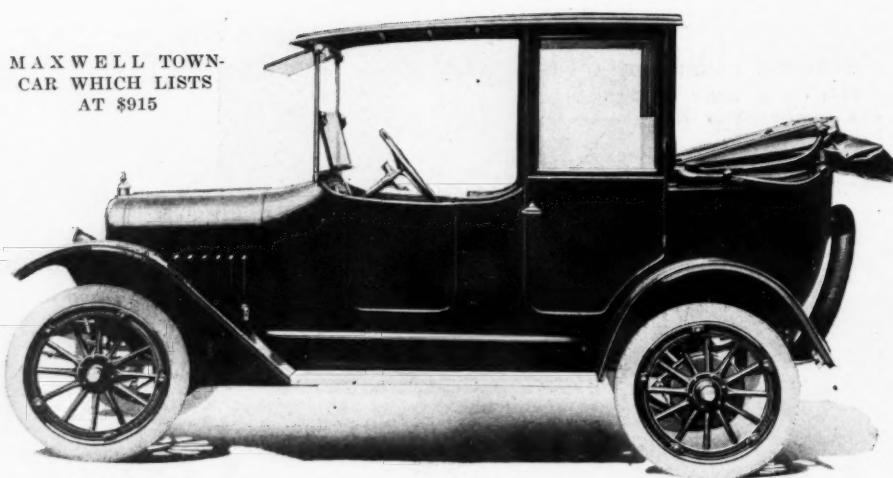
The body is widened and lengthened so that more leg



RIGHT AND LEFT SIDES OF THE 1916 MAXWELL POWER PLANT

*A few changes have been made in the power plant among them being the inclosing of clutch and flywheel, addition of combination breather and oil filler and alteration of the oiling system*

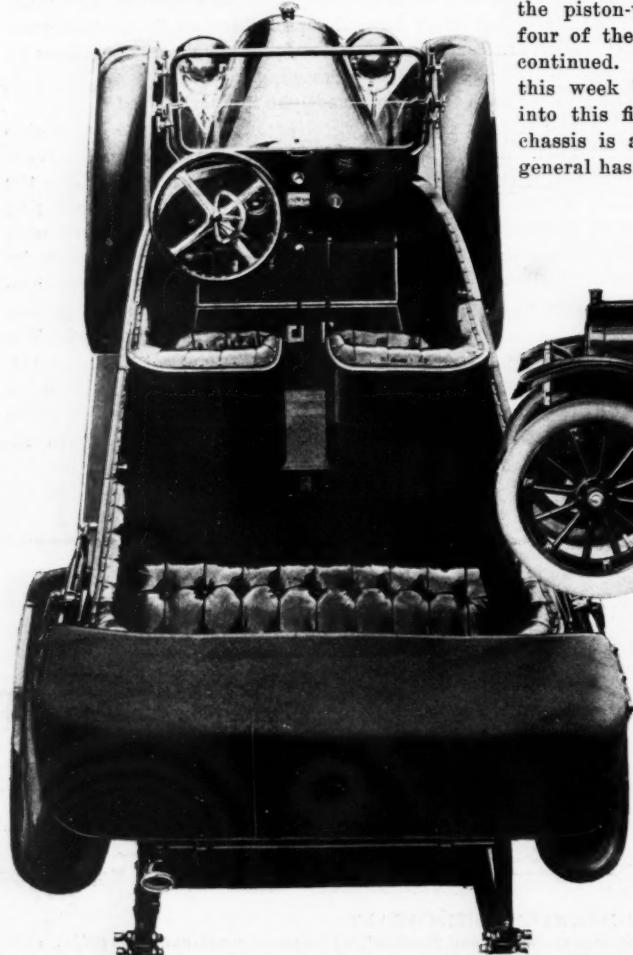
MAXWELL TOWN-CAR WHICH LISTS AT \$915



room is provided as well as 3 inches greater width in the seats. There is 29 inches leg space in the front and 28 in the rear of the touring model. Pockets have been put in all four doors, which are considerably wider to make it easier to get in or out.

In connection with the control, the accelerator and starter pedals have been put farther away from each other, so that there will be no mistakes in operating one for the other.

Points that do their part in adding to appearance are the louvres in the hood, the improved two-piece windshield, which has substantial side supports to carry the front of the one-man top—also a new feature—and the domed fenders.



THE 1916 GREAT WESTERN

*The left illustration shows the seating arrangement with the front chairs built into the body sides. Notice, also, the compartment cover under the front seats. The view above is the first Great Western six announced.*

sash in the sides, which may be slipped down into compartments in the body when desired, leaving all open with only the top permanent.

#### KISSEL HAS NEW SEDAN TOP

Hartford, Wis., July 22—While no announcement has been made by the Kisiel Motor Car Co. concerning its 1916 line, it is assured that the All-Year model and the six-42 will be continued practically unchanged. It is stated that the body department of the concern has perfected a new sedan top design, which will be announced shortly.

#### FORD PLANT FOR OKLAHOMA CITY

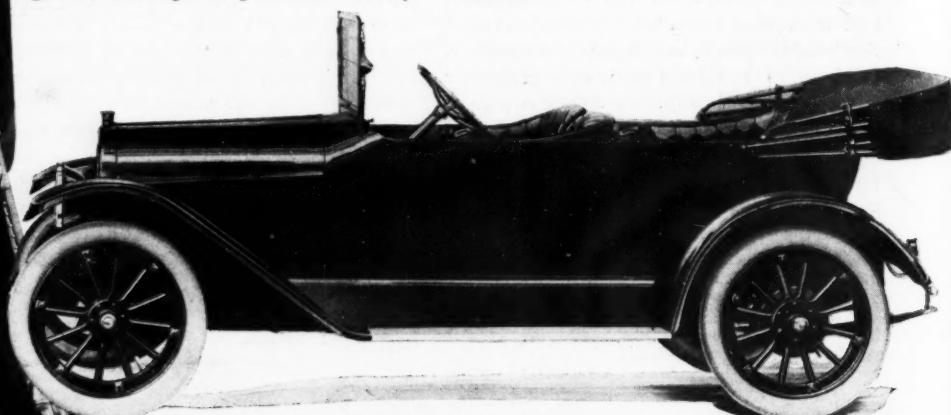
Oklahoma City, Okla., July 16—An assembling plant that will employ between 300 and 500 men is to be built in this city by the Ford Motor Co. within the next 6 months. The plant will be situated on the block of ground west of the courthouse, between Main and Grand streets, and abutting the Frisco railroad tracks.

## Great Western Introduces New Body Mounted on Concern's First Six Chassis

A N unusually attractive six-cylinder model at \$1,185 will be made by the Great Western Automobile Co., Peru, Ind., for the coming season and this means that the piston-valve four and the poppet four of the past season have been discontinued. The announcement of a six this week brings the Indiana concern into this field for the first time. Its chassis is an entirely new one and in general has a power plant with a 3 by 5

Pittsburgh motor, a disk clutch and three-speed gearset. In the drive, rear axle construction, etc., there is nothing which departs from the conventional, but there are many body features which are new and worked out to a nice degree.

The body is a spacious five-passenger with divided front seats, but these instead of having no connection with the body sides are built in and upholstered all around.



Comfort seems to have received a great deal of attention by the Great Western engineers, for they have done away with compartments under the seats which ordinarily are used for the storing of tools, top cover, etc., and also with exterior luggage carriers.

Instead of this arrangement there are compartments under the front and rear floorboards. In the front a compartment contains the battery and tools and the cover of this is hinged so that it requires little effort to gain access to the materials

in the box. Another compartment under the rear of the front seats is used to house the top cover and spare inner tubes and whatever other small items may be accommodated. Also under the tonneau floor boards are two large luggage-carrying spaces and each is large enough to hold two ordinary suit cases. This makes a novel and convenient method for carrying luggage and keeps the exterior of the car free. These compartments are built into the floor boards and it is said do not interfere with



GREAT WESTERN FRONT COMPARTMENT

*This is for tools and forms a most convenient place and offers room for almost any size tool required for ordinary use*

the removal of the boards when inspection or adjustment of any of the mechanical units underneath is necessary.

The body itself has conservative lines, the front being well tapered, the sides nicely curved and the whole a matter of well-blended units. The top fitted to this body is a one-man type with Fabrikoid covering and fitted with Jiffy curtains.

In the mechanical assembly of the car is a block motor made by the Pittsburgh Model Engine Co. This is a simple motor with L-head cylinders with the valves, ignition system and exhaust manifold on the left side. The latter manifold has a square



A GREAT WESTERN BODY FEATURE

*One of the compartments under the tonneau floor. This space is large enough to hold two ordinary suit cases*

section and is held to the casting by six bolts. The cooling is by pump with the shaft of the latter extended so as to drive the Remy combination distributor and interrupter, which is fed from a storage battery. The carburetor is a Schebler, feeding through cored passages and supplied from a 20-gallon tank in the rear of the chassis. Starting and lighting is by the Detroit system, using the Ward Leonard method of current control.

The clutch is a disk made by the Detroit Gear & Machine Co. and the gearset in unit is furnished by the same concern. The drive members are a hollow propeller shaft fitted with Hartford joints and a Salisbury three-quarters floating axle. Tires are 33 by 4.

#### NEW MOLINE ROADSTER

Moline, Ill., July 19—A new type of roadster has been added to the line of the Moline Automobile Co., this recent arrival using the model 40 chassis and a body of

unusually large dimensions. The rear part of the body is formed into a deck under which are two compartments. One of these is parallel with the seat and has an oval door on the right side of the car. The other compartment is much larger and access is gained by a door at the rear. This space is sufficiently large to allow of carrying a steamer trunk, spare tires, suit cases and additional luggage.

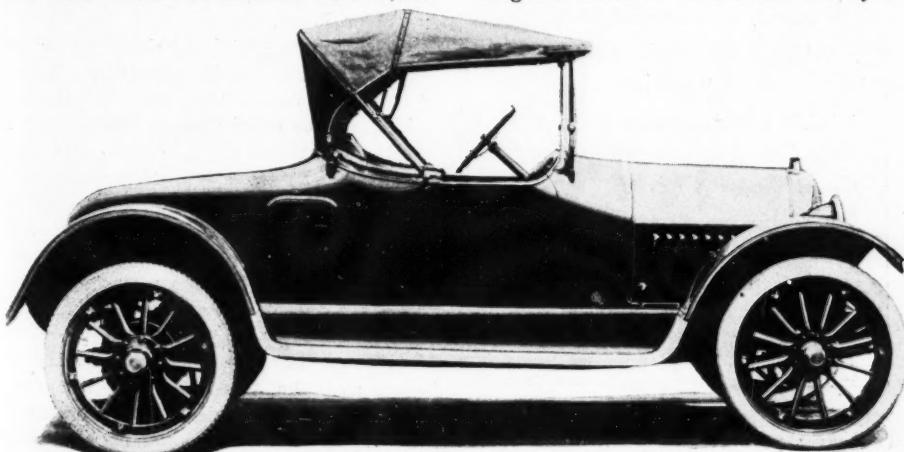
The Moline 40 chassis, upon which this body is mounted, is no different from that using the touring body. The motor is a four-cylinder Knight-type 3½ by 5, the clutch a cone and the gearset a three-speed. The wheelbase is 118 inches and tires 34 by 4.

#### JACKSON HAS AN EIGHT

Jackson, Mich., July 19—Three new Jackson models, two of them equipped with eight-cylinder engines and the third with a four-cylinder motor, are announced today by the Jackson Automobile Co., these replacing the four- and six-cylinder 1915 models. The eights are in two sizes, the smaller, designated as model 348, having 112-inch wheelbase and selling at \$1,195, with 2½ by 4½ motor. The larger eight, model 68, is a \$1,685 car with seven-passenger body on a 124-inch wheelbase chassis. Its motor is 3½ by 4½. In the four-cylinder model 34 chassis, the motor is 3½ by 5 and the wheelbase is 112 inches also. This car is to sell at \$985.

These prices are all big reductions for Jacksons, as last season's four sold for \$1,375 and the six was \$1,650.

The motors used are all Northways, and the two eights follow the same general design throughout. The two-cylinder blocks are at 90 degrees and the crankcase is split vertically into two halves, one being integral with each set of cylinders. The four is the standard Northway design.



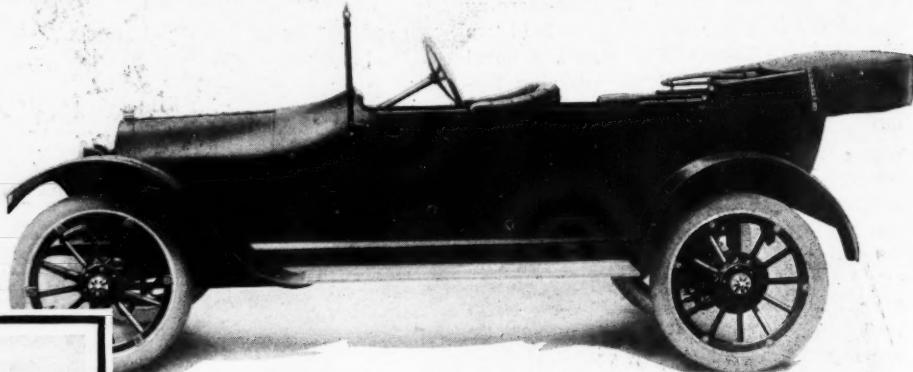
NEW MOLINE TWO-PASSENGER ROADSTER

*This body is mounted on the model 40 chassis. It has an unusually roomier portion in the rear*

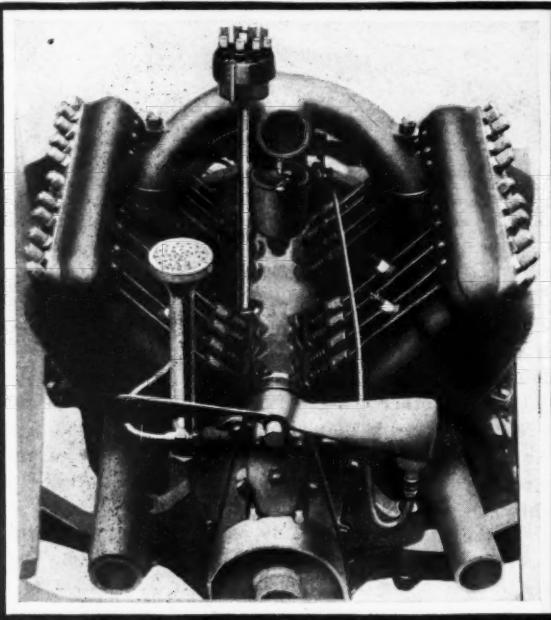
# Briscoe for 1916 at \$750 as a Four, \$950 as an Eight

## Motors Interchangeable on One 114-Inch Chassis

THE advantages of so designing motors and chassis that the power plants are interchangeable in the same frame is brought out by the announcement just made by the Briscoe Motor Co., Jackson, Mich., which offers to furnish its 1916 chassis equipped either with a new four-cylinder engine or an eight-cylinder type. The four-cylinder machine is so radically different from that of last season that it



BRISCOE TOURING CAR, TAKES EIGHT OR FOUR-CYLINDER MOTOR



FERRO EIGHT-CYLINDER MOTOR USED IN 1916  
BRISCOE

may rightfully be called a new job throughout. The scheme is to furnish either engine, charging \$750 for the car with the four and \$950 with the eight. If, after running the four for 30 days, the buyer decides he would rather have an eight motor, then he pays the \$200 difference, and the Briscoe company takes back the four and installs the eight.

### Car Is Larger and More Powerful

Summed up, the new Briscoe four is a larger and more powerful car than the 1915 model. The motor is an entirely new design with a bore of  $3\frac{1}{16}$  inches, as compared with the  $3\frac{1}{8}$ -inch bore of the previous engine. The stroke is the same— $5\frac{1}{8}$  inches. Another important difference is the separation of gearset and engine, the former now being located amidships in contrast to the former unit power plant construction.

The new body gives 3 inches more leg room in the rear, and a new cantilever rear suspension supersedes the semi-elliptic design of 1915 models. The wheelbase has come in for a 7-inch increase to 114 inches, and along with the general enlargement of the car, tires have been increased from 30

one. The former car was equipped with one headlight in the center of the radiator top. Legislation in some states is against the single headlight, and to take care of the whole country, it was thought advisable to adopt the conventional two-lamp method of lighting.

The eight-cylinder engine is made by the Ferro company, Cleveland, and adheres

### FEATURES OF THE 1916 BRISCOE

*Eight or four in same car  
New four has 5-16 larger bore  
Eight motor a Ferro  
Body is 3 inches longer  
Wheelbase increased 7 inches  
Control pedals adjustable  
Amidships gearset now used  
Two headlights instead of one*

very closely to the design as brought out the early part of this year. The valves are overhead, with rods running up from the single camshaft in the center of the

by  $3\frac{1}{2}$  to 32 by  $3\frac{1}{2}$  size. Control pedals now are adjustable, and the double, internal-expanding brakes have been replaced by the more usual internal expanding emergency and external contracting service sets.

Domed fenders add to the general appearance, and they have been more rigidly fastened, by attaching them directly to the body in place of the previously used method of mounting them by brackets to the frame. There is less chance for rattle and wobbling by this construction.

Though of no great constructional importance, a noticeable change is the fitting of two headlights instead of

V. Cylinders are 3 by  $3\frac{1}{2}$ , giving a piston displacement of 198 cubic inches.

In this engine, the two blocks of four cylinders are set at the usual 90 degrees, and the upper half of the crankcase is made integral with the cylinders.

Sixteen cams are used on the single cam-shaft, mounted in the V, giving a cam for each valve and making possible a simple duplicate four-cylinder timing. That is, No. 1 cylinder on the right is followed by No. 1 left, and so on. There is also another special feature of the engine, namely, the use of hot-pressed-steel rocker arms for operating the valves. These are pivoted in the top of the cylinder heads on ball joints, so that adjustment is made through the use of knurled nuts protruding through the top of the cylinders. In order to take up any play between valve rod and rocker, it is a simple matter to loosen the lock nut and turn the knurled adjustment screw until the proper clearance is obtained.

### Valve Mechanism in Head

The cylinder heads are detachable. These heads carry all the valve mechanism, the water outlet connections and everything at the top part of the cylinders with the exception of the spark plugs, which are placed in the V-side of the cylinders just below the joint between head and cylinder block.

A combined fuel intake and water outlet manifold is a unique feature. The water passage really surrounds the inner fuel pipe, and the connection to the radiator is at the front side of the cross double-duty manifold. By the use of such a concentric manifold, the hot water circulates around the incoming fuel, aiding vaporization. As thermo-syphon cooling is employed, this outlet water construction works very nicely, since there is a considerable distance between the top of the combustion chamber, which is the hottest part of the engine, and the top of the radiator, due to the V form. This adds materially to the rapidity of movement of the circulating water.

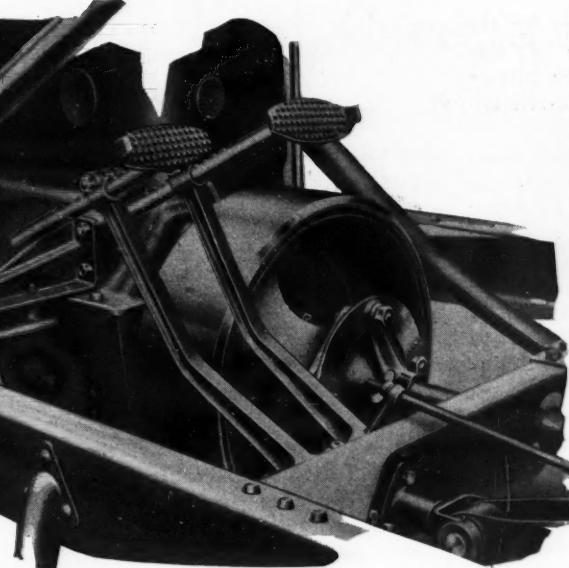
In the attachment of the connecting

rods to the crankshaft, the forked design is used. That is, one rod has a yoked end, and the other rod for the opposite cylinder fits between the arms of this yoke. So as to make adjustment of the caps as easy as possible, the bearings have been split on a horizontal plane, instead of at right angles to the centerline of the rod.

With practically nothing in common with the previous Briscoe motor, the new four is an extremely smooth-appearing design, with the cylinder block and upper half of the crankcase in one place. The head is detachable, and valves are located on the right and compactly inclosed. It is suspended at four points in an unusual manner by four brackets, which are separate pieces bolting to bosses located on the sides of the cylinder casting. **Develops 38 H. P. at 1,700 R. P. M.**

It is of the high-speed type, with 38-horsepower produced at 1,700 r.p.m. Light pistons aid in permitting of high speed without vibration, and, in addition, the crankshaft is of large proportions and mounted on three bearings. The connecting rods are of regular form and forged from chrome-vanadium steel. The piston-pin bearing is in the piston bosses, the upper end of the rod being split on one side, and the pin clamping it by a bolt. Two bolts hold the cap to the lower end of the rod. The pistons are fitted with two rings, and the heads are concave, so as to give a desirable semi-spherical combustion chamber.

The mounting of the crankshaft is peculiar in that separate brackets bolt to the



VIEW OF 1916 BRISCOE, SHOWING CONTROLS AND CLUTCH

bottom of that portion of the crankcase which is integral with the cylinders. These brackets have exactly the same function as the usual integral crankshaft bearings in the crankcase, but the construction is lighter, because with equally rigid support, less metal is required than if the entire crankcase were extended down far enough to carry the bearings within it. This is especially true where, as in this motor, the upper part of the case is a part of the cast-iron cylinder block. To extend the heavy metal all the way down would add materially to the weight. As it is designed, a pressed-steel cover acts as the lower part of the case housing the crankshaft and these bearing brackets, while another piece closes the bottom and acts as the oil reservoir.

The whole arrangement is designed to make the engine as light as possible, and

at the same time crankshaft rigidity and bearing strength are not sacrificed. The brackets are forgings, and the caps are held on by two  $\frac{1}{2}$ -inch bolts, which run up to the cylinder block extension, and assist in carrying the bearing load. Thus that part of the crankcase which really incloses the shaft is merely a housing or cover and has nothing to do with carrying the load of the shaft.

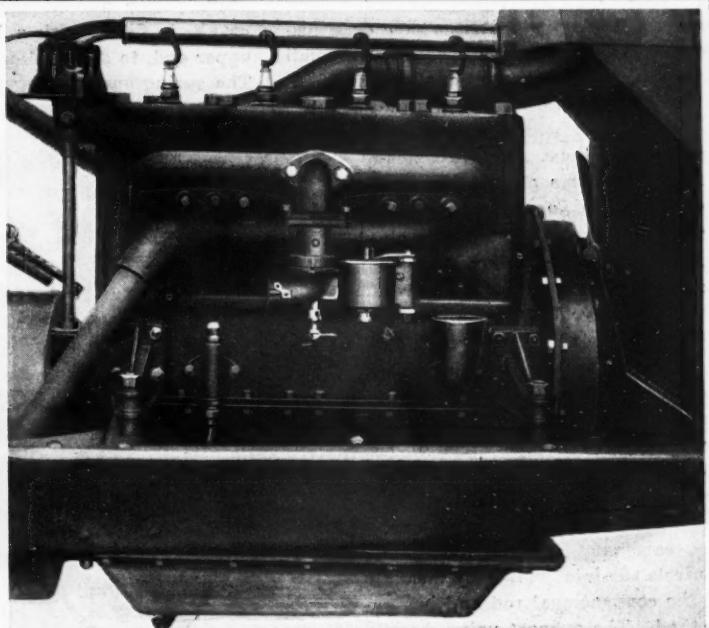
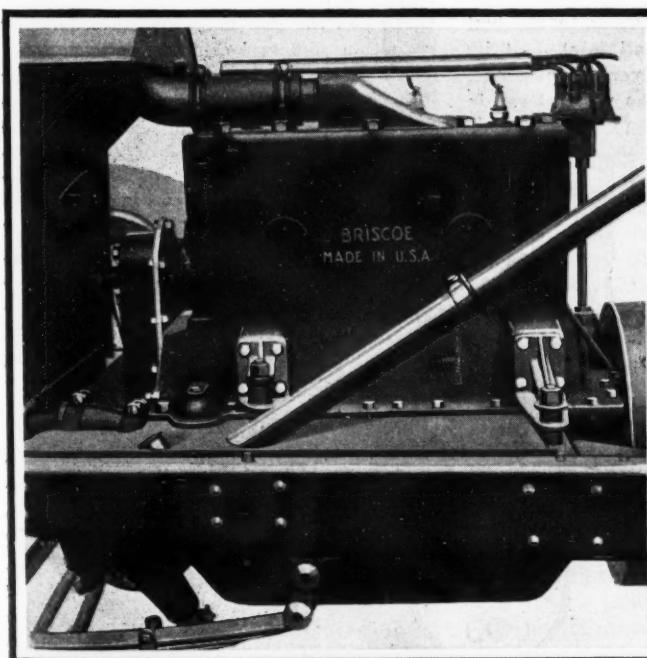
Thermo-syphon cooling is well applied to the engine. The cylinder heads are entirely waterjacketed, while the jacketing of the cylinders is uniform, due to the comparatively even thickness of the space around all the cylinders. Also, the water is carried down the entire length of the cylinders,

and the water inlet is at the extreme lower front side of the casting as shown below.

Drive for the cooling fan is unique in that a friction means is employed. The camshaft gear face is made wide enough so that two grooves can be accommodated in the face and back of the gear teeth. These grooves receive two small steel friction disks mounted on the fan shaft. Pins, carrying small spiral springs, pass through the two disks and the fan shaft flange, thus maintaining an even tension of the disks upon the grooves in the driving gear. The result of this scheme of drive is a noiseless and simple combination. This mechanism, as well as the front gears, is enclosed by a pressed-steel plate.

#### Ignition by Atwater Kent system

Driven off the end of the camshaft is the vertically-mounted Atwater Kent ignition distributor. The balance of the elec-



TWO VIEWS OF THE 1916 BRISCOE FOUR-CYLINDER MOTOR

trical functions are provided for by the motor-generator mounted on the left side of the gearbox. This charges the battery and lights at 6 volts, and uses 12-volt circuit for starting.

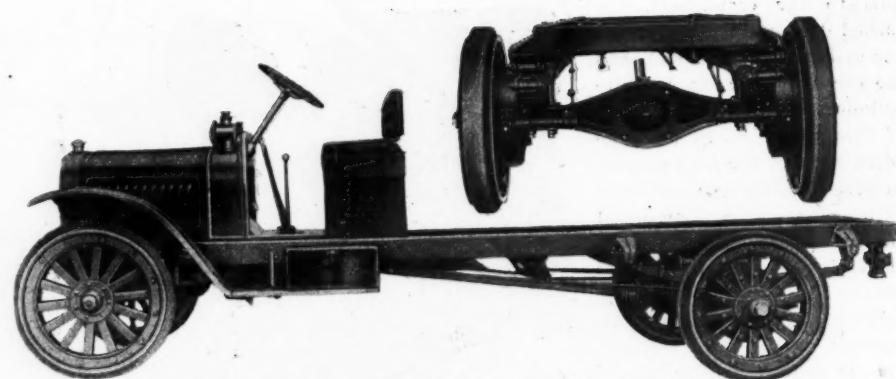
In lubricating the engine, the circulating-splash method is used. The oil is brought up from the reservoir by a plunger pump operated by the camshaft, and it is delivered through a sight-feed on the dash and thence to the oil troughs under the connecting rods, these having dippers on their caps to catch the oil and throw it to the bearing surfaces, from which it drains back to the sump.

By placing the motor and gearset in the frame as separate units, the interchanging of the four and eight is readily accomplished with the least replacement of parts. The substitution of one motor for the other is therefore merely a matter of connecting the shaft between the clutch and gearset, so far as the drive is concerned.

#### Gearbox in Unit with Torsion Tube

The gearbox is really in unit with the torsion tube which surrounds the propeller shaft. The front of the gearbox has two arms which hinge to a cross member. Thus axle variation, due to road unevenness, is provided for by this gearbox hinging. As the rear of the gearbox attaches to the torsion tube, there is no frame support for it except at the front.

A floating Salisbury rear axle is fitted. This has two ball-bearings supporting each wheel, one on either side of the vertical centerline of the wheel. This is in con-



NEW INTERNAL-GEAR DRIVE REPUBLIC 2-TON TRUCK

trast to the type in which a single bearing is placed directly under the wheel, and there is better support and less chance for misalignment and resultant wheel wobbling. Likewise, two ball-thrust bearings carry the pinion shaft, and there are also roller and ball-thrust bearings on either side of the differential.

In its application of cantilever springs, Briscoe uses the full cantilever type, with trunnion mounting at the center to a frame bracket, a sliding bracket at the front, and attachment of the rear under the axle tubes.

Three body types are offered. These are the touring car, three-passenger roadster and two-passenger coupé. The roadster still is styled the Clover Leaf, as the center seat is set somewhat back of the two outside ones. The coupé costs \$1,000 with four-cylinder motor, and there is, of course, the same motor exchange proposition.

used to hold the piston against its seat, S, which is a regular 45-degree type. The head of the piston also is chamfered to fit the seat.

With the exhaust valve open the burned gases can pass out as shown in the illustration at the right being deflected slightly to enter the vertical passage.

#### NEW REPUBLIC TRUCK

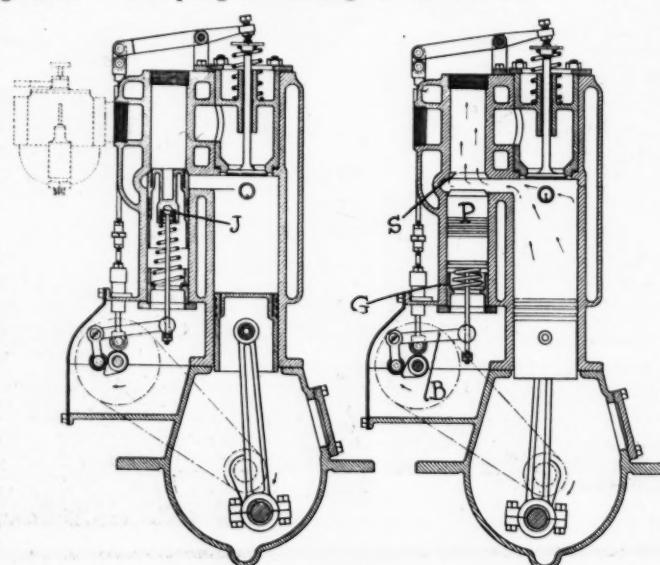
Alma, Mich., July 19—In adding a new 2-ton internal gear drive model the Republic Motor Truck Co. has increased its line to four chassis. While internal gear drive is not new for this concern, having used it on a 1,500-pound vehicle the past season, the 2-ton job is new throughout. It is designated as model A, lists at \$1,575, and is said to contain a great amount of nickel-steel parts, among them being the front axle, gearset shafts, spring bolts, driving gears and pinions, etc.

It is a neatly laid out chassis of 144 inches wheelbase and fitted with a Continental 3½ by 5, block-cast motor, sphonically cooled. Ignition is by fixed-spark magneto, carburetion by a new Stromberg with gas-velocity governor attached. The clutch is a dry-disk, the gearset a three-speed and the rear axle with internal gear reduction of 9 to 1 on high.

As in the usual type of internal gear drive there are two rear members, a stationary one, for sustaining the load and this is of I-beam construction here, and another for driving the wheels. The live axle housing is bolted to the front of the dead portion. The entire internal system has parts which are interchangeable so that right or left shafts, wheels, etc., are eliminated. The chassis weight is given as 3,800 pounds.

#### BRIGGS TO BE CONTINUED

Detroit, Mich., July 19—The business of the Briggs-Detroiter Co. will be continued according to a statement by A. O. Dunk, of the Puritan Machine Co., purchaser of the personal property of the bankrupt company. A new company is being formed and incorporation papers already have been filed.



MEDANICH MOTOR WITH PISTON-TYPE EXHAUST VALVES

## Piston Valves on Medanich Motor Controlled by Bell-Crank Arrangement

THE Medanich Motors Co., Inc., Louisville, Ky., is responsible for a new type of four-cycle motor which uses piston-type exhaust valves operating in small cylinders and the conventional design of inlets. The prime object of the designer of this motor was to relieve the exhaust valve of pressure at the time of opening and also to obtain an unusually large valve port area. The latter is obtained by using valves with a clear diameter equal to two-thirds of the cylinder bore.

In the Medanich motor, which is shown in section on this page, the oddity consists in the exhaust valve construction, which as will be noticed, is in the form of a spring backed piston valve P, operating in its own cylinder which is parallel with the regular one. One camshaft is used and this controls the inlet valves by means of the conventional rod and beam method. The exhaust valve, however, is controlled by means of a bell-crank arrangement B. The

# Connecticut Ignition for Ford Cars

## Battery Protection Like Regular System

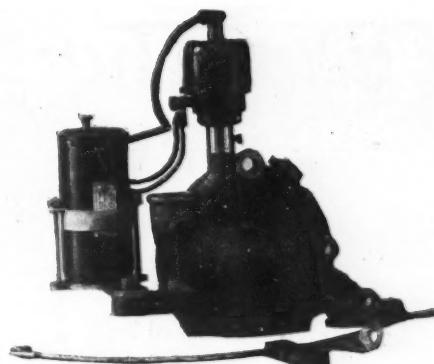
THE Connecticut Telephone & Electric Co., Meridian, Conn., has brought out a new ignition system especially adapted to Ford cars. The complete outfit, including wiring and everything except the battery, sells for \$28.50 and it can be quickly installed upon any Ford car. As shown in the accompanying illustration, the plate which fits over the timing gears of the Ford at the upper front portion of the crankcase is replaced by another, which is interchangeable with it, but which contains the vertical shaft for the timer-distributer, together with the bevel-gear drive necessary for operating it. On a bracket, integral with this same plate, the single coil, which is a high-tension, non-vibrating design, also is mounted and connected to the timer-distributer by short wires.

### Battery Disconnecting Switch

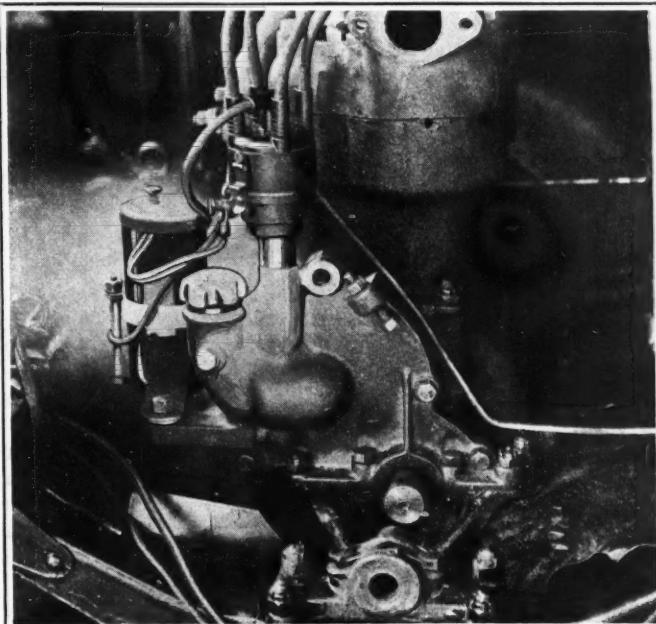
The remaining unit is a switch which includes the Connecticut feature of disconnecting the battery, should the switch be left in the on position with the motor not running. The automatic release is effected by a small rheostat which becomes heated from the continuous current passing through it from the battery and bends over, making contact with a small buzzer coil arrangement, which in turn kicks the switch out of contact. Thus the possibility of running

down the battery by accidentally leaving the switch turned on is guarded against.

Another feature of the switch is that it sets flush with the dash, having only the control buttons, on their metal plate, visible on the driver's side. The coil being mounted on the new timing gear cover plate, which replaces the old one, does away with an awkward mounting on the dash of this instrument, thereby permitting a neat layout, which can be installed



CONNECTICUT UNIT READY FOR MOUNTING



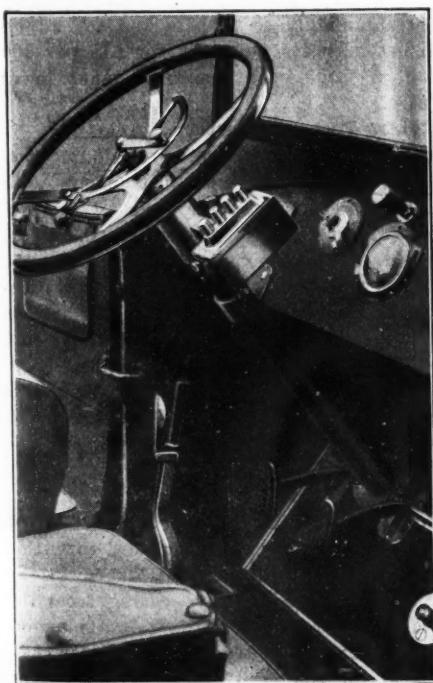
CONNECTICUT IGNITION SYSTEM MOUNTED IN FORD MOTOR

easily with the tools most generally in the possession of the average car owner and is a feature introduced by this concern in its regular installation.

The Connecticut system operates on the open circuit scheme, the interrupter being so constructed that the primary circuit of the coil is saturated before the breaking point is reached in order to produce a spark of maximum intensity upon the interruption of the circuit. This and the distinctive feature included in the switch are two of the most important of the Connecticut outfit.

### Lag Said to be Eliminated

It is claimed that with this system both electrical and mechanical lag have been eliminated throughout the entire range of motor speed. The breaker mechanism consists of an arm carrying one contact piece, a stationary block carrying the other, an insulated roller carried upon the arm and a cam mounted upon the driving shaft. On the driving cam there are four high spots for the Ford outfit, each of them being 90 degrees from the next. This allows a period for maximum saturation.



NEW C-H MAGNETIC GEARSHIFT CONTROL

Synchronism of ignition is obtained in this system by the elimination of the electrical lag due to the intensity of the induced current. In other words, for all practical purposes, the spark occurs at the same position as regards piston travel, regardless of the speed of the engine or any given position of the spark advance lever.

### Wiring is Simple

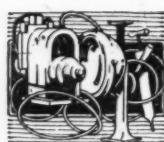
The wiring of the system is very simple and by following the directions with the outfit, even an amateur motorist will have no trouble in installing the outfit. The current is taken from the coil lead to the central point of the distributer mechanism and from there carried by means of a brush to the high-tension terminals from where the current is taken on the high-tension lead directly to the spark plug. A J. Picard & Co., New York, are exclusive distributors of this new ignition outfit for Fords.

### NEW GEARSHIFT CONTROL SWITCH

Milwaukee, Wis., July 19—The Cutler-Hammer Mfg. Co., maker of the Vulcan magnetic gearshift, which now has been re-named the C-H gearshift, has brought out a new type of control unit for this installation. The new unit has the selector switch and push buttons for controlling the gearshifting, arranged in numerical order in a straight line in a small cast-aluminum box mounted under the steering wheel as shown herewith.

With the C-H magnetic gearshift pressure on one of the buttons which indicates a certain speed, results in that speed-change being made the next time the clutch is fully depressed, so that a speed change may be contemplated. The clutch may be thrown out without interfering with the setting of the switch which does not cause gearset operation until the clutch has been depressed all the way.

The new control unit is within easy reach and makes visual search for the buttons unnecessary.

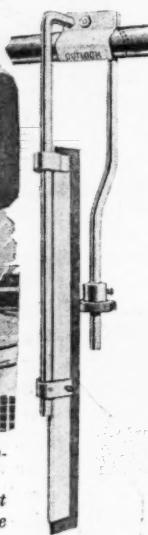


# The Accessory Corner



FIG. 1—OUTLOOK WINDSHIELD CLEANER

*This is operated without leaving the seat and cleans the outside of the windshield by squeezing out the water*



#### Outlook Windshield Cleaner

THE motorist whose car is fitted with a windshield which has no rain-vision feature, knows the difficulty encountered in driving through a rainstorm. The glass becomes so mottled with raindrops that slow driving is necessary and occasionally a wiping of the outside of the glass. In order to be able to clean the outside of the shield without moving from the driver's seat, the Outlook Windshield Cleaner Co., Cleveland, O., has brought out an attachment which has a cleaning portion somewhat similar to cleaners used for store windows, that is, it is used to squeeze the water from under it. In the Outlook device, however, operation is by means of a lever which causes the cleaning portion to move through an arc of about 180 degrees as shown in the illustration in Fig. 1. One sweep of the cleaner is sufficient to make the glass clear enough to allow of unobstructed vision. The wiper is adjustable so that only that portion of the windshield really required by the driver, need be cleaned.

The Outlook may be attached to any

windshield and is finished in brass, black or nickel. Weight is 10 ounces and price \$1.50 and it may be attached easily.

#### Easybak Cushion

Claiming that driving may be made more comfortable by supporting the small of the back, the Holden Mfg. Co., St. Paul, Minn., has perfected a cushion, called the Easybak, which is said to be effective in removing excessive strains from the driver's back. This cushion is designed to be placed against the back of the seat as shown in Fig. 2 and as illustrated, support that portion of the driver's body which becomes weakened easily.

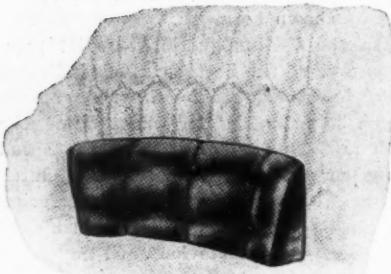


FIG. 2—EASYBAK CUSHION FOR COMFORTABLE DRIVING

*This cushion fits the small of the back and is said to make driving much more comfortable than if the back were not supported*

Furnished with a leather case, the whole being of convenient size to fit a pocket



FIG. 4—ROBERT POCKET AMMETER

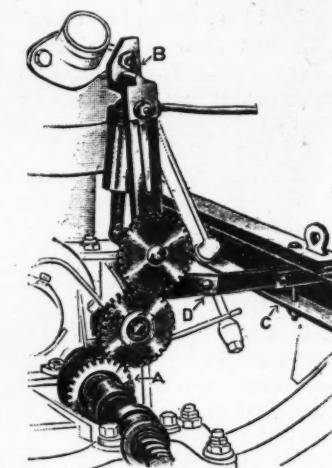


FIG. 5—JULECO FORD PUMP

*This is a plunger type operated by gearing from the front end of the crankshaft*

The Easybak is 21 inches wide, 8 inches high and 4 inches thick at the bottom, tapering to about  $\frac{1}{2}$  inch at the top. Price is \$3.50 for leather-covered cushion; \$2 for imitation leather; and \$150 for waterproof fabric of either dark gray or brown color.

#### Ugottahavit Tool

A simple tool which may be used either as a wrench for nuts up to  $\frac{1}{2}$  inch, a screwdriver, Prest-O-Lite key, or bottle opener is being marketed by the E. O. Bulman Mfg. Co., Grand Rapids, Mich. The tool is a flat piece of steel with the wrench portion of the alligator type as shown at W in Fig. 3. The part C is used as a bottle opener, B as a Prest-O-Lite key and A as a screwdriver. This accessory is sold mainly to jobbers and for advertising purposes and sells for \$15 per 100 but in large quantities at a much lower price.

#### Robert Pocket Ammeter

A line of pocket meters, including ammeters, voltmeters and instruments with both scales, is manufactured by the Robert Instrument Co., Detroit, Mich. These meters are of convenient size and carried in a leather case which fits a pocket without causing undue bulging. Contact is made by one terminal at the bottom and another at the end of the piece of insulated wire, as shown in Fig. 4. Voltmeters and ammeters sell for \$4 and volt-ammeters for \$6.

#### Juleco Ford Pump

The Judd & Leland Mfg. Co., Clifton Springs, N. Y., announces a new type of motor-driven tire pump for Ford cars, this pump being permanently attached to the engine and operated by gearing from the front end of crankshaft. It is a plunger-type pump, bracketed to the cylinder casting at the top at B in Fig. 5, and at the bottom by means of the truss D, which is

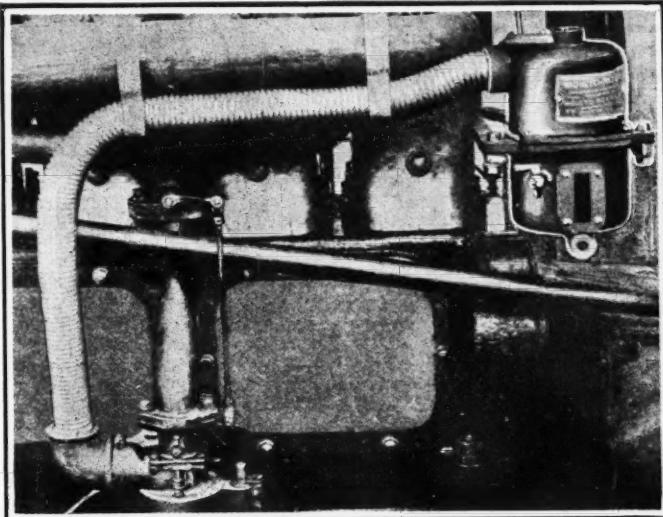


FIG. 6—MOISTO-RIZER FOR IMPROVING MOTOR

*This attachment is designed to feed moist air to the carburetor and thus, according to the maker, prevent carbon deposits and make for smoother running*

connected to another portion held in the frame channel by bolt C. The method of attachment is quite simple, according to the maker. The split gear A is mounted on the forward end of the crankshaft and between it and the pump gear is an idler. The pump is put into operation by a hand lever. Price is \$4.50 complete with all gears, brackets, etc.

#### Stevens-Ford Reserve Fuel Valve

Three new Ford accessories are announced by Stevens & Co., New York, one of these being a fuel control unit which gives the system a 1-gallon reserve feature. The valve is one of the three-way type, allowing of the gasoline being shut off entirely, or it can be turned so as to drain the tank or use only that fuel above the 1 gallon level. The valve is screwed into the bottom of the gasoline tank and the control handle operating across a dial, is mounted on the heel board of the front seat. This makes a convenient arrangement, for the driver may shut off the supply of fuel without leaving the seat. The valve is shown in Fig. 9.

The safety-first radiator-cap ornament also shown in the illustration is another Stevens' accessory and the third is a drill and tap for removing broken cylinder head bolts.

#### Gilbert Wire Wheel Cover

A cover which protects an entire spare wire wheel, rim and tire is part of the line of the Gilbert Mfg. Co., New Haven, Conn. This cover, shown in Fig. 9 is furnished in many colors and has a special opening for tire holding straps to pass through the rear. Price for the black-enamel duck is \$5 for sizes up to 36 inches and in artificial leather \$7 for the same sizes.

#### American Automatic Jack

The American Automatic Automobile Jack Co., Hicksville, O., is offering a new type of garage jack which suspends the wheels above traps or small pits in the

Pressure on a lever then causes the trap doors to drop, leaving the wheel suspended upon four rubber-cushioned jacks. The



FIG. 7—J. M. FORD ABSORBER

*The price of this accessory now is \$15 per set of four instead of \$25*

car, when backing off the jack, automatically resets the traps.

#### J-M Ford Shock Absorber Price Reduced

Announcement is made by the J. M. Shock Absorber Co. that its Ford type ab-



FIG. 9—THREE NEW ACCESSORIES

*Left, Stevens gasoline reserve attachment for Ford; middle, Stevens radiator ornament; right, Gilbert case which covers wire wheel, rim and tire*

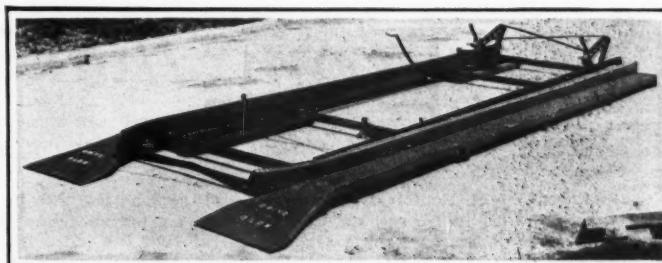


FIG. 8—AMERICAN AUTOMATIC JACK

*The car is driven onto the guides and pressure on a lever causes traps to fall leaving the wheels suspended*

jack itself. The American is shown in Fig. 8 and in operation the wheels of the car are guided upon the two runways so that each wheel rests upon one of the pit covers.

sorber has been reduced in price from \$15 per pair to \$8 or \$15 per set of four in stead of \$25. The J. M. Ford is shown in Fig. 7. This fitment uses a helical spring mounted in a dust and waterproof casing which is mounted on drop-forged hangers. The plunger works up and down on a bushing of Non-Gran bronze.

#### Moisto-Rizer

Believing that most air fed to the carburetor makes for better operation and more power, the Moisto-Rizer Co., Stockton, Cal., has produced an attachment whereby all air fed to the carburetor may be saturated with water. This moistened mixture also is said to eliminate excessive carbon deposit and produce a smoother running motor. The attachment is in the form of a container, shown in Fig. 6, which is attached to the carburetor by flexible tubing so that air drawn into the motor first takes up a certain amount of water from the Moisto-Rizer. It is made in four sizes with prices ranging from \$15 to \$50, according to size.

#### Demountable Wheels for Fords

The Superior Lamp Mfg. Co., 136 West Fifty-second street, New York, announces its latest accessory for Ford cars, which is in the form of demountable clincher wooden wheels. The complete set consists of four wheels with demountable rims attached, one spare rim, wrench, bolts, etc., all ready for attachment. With this set the owner may remove the entire wheel with tire or remove the demountable rim alone. The wheels are furnished in either natural wood or black finish at \$16. They may be applied easily by any owner.



# From the Four Winds



**CALIFORNIA Motor Registrations**—Up to July 1 according to figures issued from the motor vehicle department there are 138,593 motor cars registered in California. The gross registration receipts for this half-year period totals \$1,862,623 or \$344,197 in excess of those for the like period in 1914.

**Michigan Motors Increase**—Michigan licensed 99,460 motor cars up to July 10. This is 23,138 more than the total number registered in 1914. Early this year it was estimated that about 120,000 cars would be registered in Michigan this year. Now officials say that this number is likely to be passed.

**New York Licenses Break Record**—Registrations numbering 209,189 have been made in New York since February 1. This breaks all records. Receipts for the first half of the year were \$1,667,000, compared with \$1,533,367 for the entire twelve months of 1914.

**Dealers' Annual Outing Planned**—The Automobile Dealers' Association, Syracuse, N. Y., is planning to hold its annual outing July 22. A parade of antiquated cars to show the great advance made in the industry during the last few years is to be a feature. Afterward the dealers will drive to Constantia, a village on Oneida lake, have a dinner and afterward participate in an athletic program.

**No Uniontown Hillclimb in Future**—The state highway commissioner of Pennsylvania has issued notice that no road races of hill-climbing contests in future will be allowed on the state highways. The recent hillclimb at Uniontown caused such damage to the road, it is said, that the commissioner asked the attorney general whether it is within his power to forbid such exhibitions in the future. The attorney general said it is.

**Iowa Motors Pass 130,000 Mark**—Motor car registrations in Iowa for 1915 have passed the 130,000 mark and the amount of fees received from registrations has passed the million-dollar mark. The receipts from the registration of cars did not pass this mark last year until December and the total number of cars registered during the entire year 1914 was only 106,087, compared with over 130,000 already for the present year and an estimated total of over 150,000 before the close of 1915. The total receipts last year were only \$1,040,000 and more fees were received in the first 6 months of this year than during the entire twelve months of 1914.

**Picks Up Expenses En Route**—C. W. Porter, of Los Angeles, recently arrived in Bakersfield from his home with 16 dozen empty quart beer bottles which he picked up while crossing the Mojave desert. A local brewing concern paid him \$6.40 for his empty bottles and his gasoline bill for the trip was but 88 cents. For oil, 40 cents was spent, and estimating the expenses on the return trip at the same figure he has a

surplus with which to pay for tire expenses. This experience has satisfied Porter that he can tour the continent on the same basis and he plans to leave Los Angeles for New York in a few days, collecting dead soldiers on the way to pay his expenses.

**Iowa Adopts 3-Year License Plates**—Iowa has taken a new departure from the practice of issuing license plates each year and has contracted for 250,000 tags which will be put into use January 1, 1916, and be good for three years instead of one.

**Omaha Show This Fall**—Beginning this year Omaha's motor car show will be held in the fall instead of late winter. This has been definitely decided upon by members of the Omaha Automobile Dealers' Association. The exact date of the show has not been determined.

**Hillclimb Date Set**—The annual Kennedy hillclimb of the Rockford, Ill., Motor Club will take place August 7 and the annual race meeting August 14-15 at the Rockford driving park track. These events are only for amateurs. The program for each event now is in preparation.

**Drives Saxon 150 Miles a Day**—Charles Tozman, of the Saxon-Park Automobile Co., St. Louis, Mo., has begun a 150-mile-a-day run in a Saxon and expects to continue driving this distance each day for 20 days. The car has covered that distance for each of 6 successive days. The average consumption of gasoline for the first six days was 1 gallon to each 31 miles.

**Safety First Car Saves Car**—The safety first motor car that is touring the country in the interests of the Safety First Federation of America recently had use in Chicago for some of the safety first devices with which it is equipped. A car enveloped in flames was discovered by the safety first car and the fire quickly extinguished. The crowd that gathered voted this one of the best actual demonstrations of the utility of safety first devices yet seen.

**Guard Against Buying Stolen Parts**—The problem of avoiding the purchase of stolen motor parts successfully has been solved by the Auto Wrecking Co., of Kansas City, Mo., for the last year or so during the several periods of epidemic accessory thefts. Kansas City now is suffering from such an epidemic. Inability to explain satisfactorily the possession causes a rejection of the offer of parts to this concern, or a request for a day to consider, during which thorough investigation is made.

**Plan Funds for Missouri Road**—Definite steps were taken July 9 for the immediate improvement of the National Old Trails highway across Missouri from Kansas City to St. Louis. A meeting was held at Kansas City to devise methods for raising funds to help build the road. Reports from many counties were to the effect that arrangements had already been made for building their sections, but in some districts the land is

not able to stand the necessary tax, and general funds must be raised to guarantee that the entire highway will be improved.

**Texans Complete Log Book**—Robert H. Rinehart and Harry Locke, of El Paso, Tex., members of the El Paso Automobile Club, which is an auxiliary of the El Paso Chamber of Commerce, have completed a log of the motor routes and roads leading in every direction from El Paso. The distribution of the new logs will be under the auspices of the chamber of commerce.

**Parts of Twelve Cars Make One**—Readers of certain daily papers are familiar with the "Kabibble Complex" as shown on the cartoon page. A car that might rightfully be named the Complex has been built by Louis Schwallensticker, of Alton, Ill., from parts of twelve different motor cars. The engine is a combination of parts from three other engines. The builder admits that the car, although it runs, needs some improvements.

**Motorist Turns Tables**—The usual situation was reversed recently by Thomas J. Jones, of Danville, Ill., owner of a motor car, when he filed suit for damages in the circuit court against Joseph Lawson to recover for damages to the car when Lawson declined to give the complainant half of the road. Jones avers that he was forced to run his car into the ditch to avert a collision with Lawson's buggy. Damages to the extent of \$400 are asked.

**To Investigate Short Pump Measures**—Inspection recently in Dallas, Tex., brought to light the fact that some of the gasoline pumps were giving short measures—some discrepancies being as much as  $\frac{1}{2}$  pint to the quart. Now the municipalities in other parts of Texas plan to conduct a similar investigation with a view to correcting any short pump measures that may be found to exist.

**Tourists Deplete Accessory Stock**—Many garage men located on the main and intersecting routes between middle western points and California are profiting largely by the increase in transcontinental touring. Ordinarily most of the smaller garages and shops carry a comparatively small stock of accessories and supplies, but since the rush of Overland travel these stocks have proved inadequate many times and larger orders are necessary to supply the demand.

**Montana Motors Increasing**—Never before in the history of Montana have the people been more prosperous and never before were indications of future prosperity better. As a result the office of the secretary of state is flooded with applications for motor car licenses. The average is about fifty per day and dealers assert that this will greatly increase when the present "bumper" wheat crop is threshed. There are now something over 12,000 motor cars in daily operation in Montana, which is a very creditable showing when the population of the state is considered.



DELEGATION THAT MET RECENTLY IN KANSAS CITY, MO., TO DEVISE MEANS FOR RAISING FUNDS TO IMPROVE MISSOURI SECTION OF NATIONAL OLD TRAILS

## Good Roads Activities

**Survey for New Road**—The preliminary survey for a new motor way to be constructed between Fowlerton and Charlotte, Tex., has been made by Lake Robertson, of Temple, consulting engineer of the Texas Good Roads Association. It is expected the construction of the road will be started soon.

**Promote New Texas Highway**—The construction of a motor highway between Fort Stockton and Grand Falls, Tex., is being promoted by a committee of citizens of the two towns, headed by Mayor James Rooney, of Fort Stockton. The principal work to be done is on the 18-mile stretch of road between Grand Falls and Salt Crossing.

**Marks Red Star Trail**—The Murphysboro Automobile Association has completed the marking of the Red Star trail from Murphysboro to Carbondale, Ill., and north from Murphysboro to Pinckneyville. Residents of the latter town have marked the trail from there to Coulterville. All other towns on the trail between St. Louis and Cairo, Ill., are making preparations for marking it.

**Organize to Promote Good Roads**—The Lower Rio Grande Valley Automobile Association has been organized at Mission, Tex. Its membership is composed of representative business men and farmers of the different towns of this region. The chief object of the association is to promote the construction of a system of good roads to lead from the valley to San Antonio, Laredo and Corpus Christi. Officers elected were: S. R. Gowthrop, of Pharr, president; J. A. Graham, of San Benito, vice-president; John Cook, of Pharr, treasurer; S. A. Pipes, of Mission, secretary.

**New Cut-off in Texas**—The new east and west motor highway between Amarillo, Tex., and Las Vegas, N. M., soon will be opened. It affords a connecting link between the eastern and western systems of highways. Heretofore en route to California or other far western points, who desired to travel the best advertised, sign-posted and recognized roads usually have chosen the Colorado-to-the-Gulf highway between Dallas and Trinidad, where they intersected the Ocean-to-Ocean highway and doubled back almost as far South as their original starting point before hitting a straight line for California. With the opening of this Las Vegas cut-off

the traveler may now drive due West from Amarillo, keeping the mean course of his journey, and besides saving nearly two hundred miles of travel, encounter only a level, hard dirt plains road.

**New York-Boston Road Reconstructed**—What is pronounced one of the finest stretches of roadway in the east has just been completed, in West Hartford, Conn., reaching from Vanderbilt hill to the town hall. Where formerly there was a rutty macadam road, much of which was taken up by trolley tracks, there now is a broad expanse of level Topeka roadway. The road from West Hartford center through to Foote's Corners is being resurfaced with an asphalt preparation. West Hartford is on the direct road from New York to Boston.

**Marker Dedicated on Burlington Trail**—A marker was dedicated last week on the Burlington trail at Medora, Ill., which commemorates the famous anti-slavery speech made by Owen Lovejoy July 20, 1860, when he addressed 20,000 persons in behalf of Abraham Lincoln and against Stephen A. Douglas. A barbecue was a feature of the day, 55 years ago, twenty head of sheep and seven head of cattle being killed to furnish food for the people. A number who heard Lovejoy deliver his speech attended the dedication of the marker.

**Illinois Section Dixie Highway Begun**—At the Dixie Highway jubilee, held at Watseka, Ill., July 14, the first official construction of the great north and south highway was begun. Contracts have been let for grading and otherwise improving the highway through Vermilion county, preliminary to the construction of the concrete road bed next spring. The entire section of the highway through Vermilion is provided for by a bond issue. Only 8 miles of the highway in Kankakee county remains to be constructed and a few in Will county. The length of the Illinois section is 123 miles.

**Bee-Line Route Terminus**—In addition to being given a place on the Dixie highway, Danville is to be the northern terminus of the Bee-Line route, which will extend south, via Paris, Terre Haute, Vincennes and Evansville to Nashville. When the Dixie highway route was decided upon, excluding Terre Haute, Paris, Evansville and Vincennes, citizens of these four cities determined to lay out a trail which would strike

them all and be a straight line between Chicago and Nashville. It is planned to have the entire route completed by January 1, 1917.

**Ask Assistance in Marking Roads**—The Manitoba Motor League is making a special appeal to motor car manufacturers represented by agents in Manitoba for assistance in carrying out its campaign for the proper routing and signposting the highways throughout the province.

**Impetus to Road Movement**—The good roads movement in southern Illinois has received renewed impetus through the action of putting 175 men to work on the Logan-Lee trail north of Johnson City as an initial step in the building of a highway from Minneapolis to New Orleans. The trail is marked at present from Salem, Ill., to Paducah, Ky.

**Organize to Boost Egyptian Trail**—The Centralia, Ill., Automobile Association was organized at a meeting held last week, Nathan Gumberts being elected president and L. S. Trainor secretary. The object of the organization is to boost the proposed Egyptian trail in order to secure its routing through Centralia and also to promote road improvement in general. It is believed that the membership can be made 200.

**Detours from Ideal Tour**—Motorists planning to follow the Ideal tour route this year will find it necessary to make a detour in the vicinity of Portland, Me., going from or returning to Boston. At first the regular Portland-Portsmouth highway was closed for a stretch, but in response to protests Maine arranged with the highway commission and the contractors to keep the route open between Portland and Dunstan for the present. In addition to that a detour has been mapped out that can be taken if necessary.

**Much Construction in Massachusetts**—Work has begun upon the usual plan of small town roads throughout Massachusetts and new stretches of highway, big and little, are under construction in about 350 places in the state. Before the work is ended many miles will have been improved and \$900,000 will be spent. This does not include any part of the money or the roads to be improved in the western part of the state under the appropriation act passed this year allowing \$2,500,000 for better roads in the hill town section.

## Recent Incorporations

riage Co., capital stock, \$25,000; incorporators, Harry L. Yingling, Conrad Hausrath and Robert H. McCauley.

**Hudson Falls, N. Y.**—Adirondack Garage Co., to manufacture motor cars, motors, etc.; capital stock, \$50,000; incorporators, F. C. Sherman, E. V. Bulow, G. N. Eay.

**Indianapolis, Ind.**—Public Auto Market, to sell motor cars; capital stock, \$10,000; incorporators, M. M. Cotton, T. B. Kemper, L. G. Miller.

**Kalamazoo, Mich.**—United Garage & Machine Co.; capital stock, \$6,000.

**Louisville, Ky.**—Glen Tire Co., to manufacture and sell motor car tires; capital stock, \$2,000; incorporators, J. P. Glenn, Samuel O. Wilkes, J. K. Jarvis, J. H. Wilkes.

**Louisville, Ky.**—Paige Motor Sales Co.; capital stock, \$10,000; incorporators, Edward A. Britton, J. J. Schwab and C. E. Schwab.

**Mount Kisco, N. Y.**—Westchester Oil & Rubber Co., motor car supplies, tires, oils, etc.; capital stock, \$5,000; incorporators, Charles E. McCormack, W. Frank Bally and Charles A. Barnard.

**Mount Vernon, N. Y.**—Gryphon Rubber Tire Corp., to manufacture motor car tires, etc.; capital stock, \$600,000; incorporators, S. A. Cunningham, P. S. Jones, L. Emdin.

**Newport News, Va.**—Gayle's Garage; capital stock, \$25,000; incorporators, J. P. Gayle, J. A. Massie.

**Newark, N. J.**—Security Auto Bus Co., to conduct a general motor car business; capital stock, \$25,000; incorporators, G. T. Nuse, Fred E. Hine, Ruth Nuse.

**New York**—Broadway Used Car Co., used motor car business; capital stock, \$1,000; incorporators, Louis H. Moos, Dora I. Finkelstein, Claude L. Connet.

**New York**—Lewis Roller Bearing Co., to manufacture roller bearings, etc.; capital stock, \$10,000; incorporators, Emil Auerbach, Sidney E. Levy and J. A. Cohen.

**New York**—Mendelson Auto Trucking Co., capital stock, \$1,000; incorporators, Benjamin Mendelson, Isidore Katz and Abraham Mendelson.

**New York**—Geehan's Garage, garage business; capital stock, \$1,000; incorporators, Joseph F. Geehan, Emile Weigel and Josephine A. Weigel.

**Nyack, N. Y.**—Nyack Jitney & Automobile Service; capital stock, \$2,500; incorporators, Charles D. Martin, Carroll Wolf, William Vincamp.

**Philadelphia, Pa.**—Baer Mfg. Co., to deal in motor cars; capital stock, \$20,000.

**Portsmouth, Va.**—Virginia Bus Co., transfer business; capital stock, \$5,000; incorporators, J. E. Norman, H. L. Privett.

**Providence, R. I.**—Broadway Tire Exchange Co.; capital stock, \$10,000; incorporators, Gustino Tortolani, Raffaele Tortolani and David Miller.

**Salamanca, N. Y.**—Motor Car Products Co., to deal in motor cars, engines, accessories; capital stock, \$20,000; incorporators, H. L. Odell, A. Ashworth.

**Stamford, Conn.**—Motor Products Co., motor car goods, etc.; capital stock, \$125,000; incorporators, Allen Shelden, Floyd B. Bartram and Richard K. Green.

**Troy, N. Y.**—East Side Garage; capital stock, \$5,000; incorporators, Essie L. Edwards, Theodore Litchfield, John N. Edwards.

**Troy, N. Y.**—Twin City Tyre & Supply Co., to deal in tires and motor car accessories; capital stock, \$5,000; incorporators, John Sloan, James Hansen and Laura Foley.



# Among the Makers and Dealers



**FOURTH** St. Louis Studebaker Branch—A fourth Studebaker branch has been opened in St. Louis, Mo., the Wilson Stiff-Motor Car Co., a recently organized concern.

**New Mound City King Dealer**—A service station and salesroom for the distribution of Kings has been opened in St. Louis, Mo., by the Monarch Auto Sales Co., a newly-organized concern, that will handle the King line in eastern Missouri and southern Illinois.

**New Spark Coil Factory**—The Pittsfield Spark Coil Co., Dalton, Mass., has secured a brick factory building, three stories and basement, in Pittsfield, Mass., the city where the company originated 12 years ago and will move the plant to the new quarters immediately.

**Tire Company Expands**—The Colorado Tire & Leather Co., of Denver, Colo., manufacturers of durable treads for motor car tires, is building a two-story addition to its plant that will double its present capacity—making a total of 95,608 square feet of floor space.

**Wheel Company Changes Name**—The T. S. Wheel and Mfg. Co., Milwaukee, Wis., manufacturer of ball-bearing resilient wheels for motor vehicles and a line of metal specialties and stampings for the motor trade, has changed its corporate style to the Sterling Metal Parts Co., and the wheels henceforth will be trade-marked Sterling.

**Standard Incorporates Gotham Branch**—The Standard Motor Truck Co., of Detroit, Mich., has incorporated its New York branch, with a capital stock of \$25,000. This action recently was reported as being the incorporation of the parent company, but the Detroit organization carries a capitalization of \$100,000 and no change has been made in its capital stock.

**New Supply House in Louisville**—The Highland Auto Supply Co. will open a wholesale and retail motor supply house at Louisville, Ky. Salesmen will travel five states. The company also will handle the Louisville wholesale business of the Highland Body Mfg. Co., of Cincinnati, O., which formerly maintained a branch there. The Highland Auto Supply Co. is the distributor for Rex plugs, Manzell motor-driven pumps; state agent for Wheeler & Schebler carburetor and will feature a large line of Babbitt repair parts.

**Overland's Morrow Plant to Be Enlarged**—The Morrow Mfg. Co., Elmira, N. Y., where Overland parts are made, is to be enlarged immediately by one-third its present size and capacity. The list of more than 2,000 employees will be proportionately extended. By September 1, the Willys-Overland company will have an output of 600 cars a day at the local plant. Within less than one year the company expects to manufacture and ship 1,000 cars every day. The company now has more than 11,000 factory and office employees in Toledo, O. A night force of 1,500 is working. The company now is 2,600 cars behind on orders.

**Club for Hupp Employees**—A clubhouse for the benefit of the employees of the executive building of the Hupp Motor Car Co. has been opened on Milwaukee avenue, Detroit, Mich., adjacent to the factory. The clubhouse is built along the lines recently decided upon by J. Walter Drake, president of the Hupp company, to better the conditions of the employees and of the neighborhood. A few days ago the company fitted up a playground in the rear of the factory, which was turned over to the city recreation committee for the

benefit of the children of the neighborhood. These are the children of workmen in the Hupmobile and other motor plants in that section of the city.

**Cross-Licensing Agreement Successful**—The cross-licensing agreement plan of the National Automobile Chamber of Commerce has been a signal success, the formal brief having been approved and subscribed to by sixty-three out of the ninety-three member manufacturers. The chamber feels that it has averted much patent litigation by this means.

**New Bloomington Sales Company**—The Motor Car Sales Co., of Bloomington, Ill., has been licensed by the secretary of state. The concern, which is made up of Jesse Rice, W. L. Hinkle and W. C. Hadliff, will act as distributor for the Chalmers and Dodge cars in five counties of central Illinois. The company is capitalized at \$25,000.

**Gear Manufacturing Company Incorporates**—The Service Gear and Machine Co., of Reading, Pa., was incorporated recently in the state of Pennsylvania for \$20,000. The concern makes parts for service stations and parts for jobbers. It also makes a specialty of transmission gears, bevel gears, axle shafts, piston rings, etc.

**Packard Appoints Chief Engineer**—J. G. Vincent, vice-president of engineering for the Packard Motor Car Co., Detroit, Mich., has announced the appointment of O. E. Hunt, his assistant for several years, as chief engineer. Mr. Vincent has inaugurated a unique factory engineering organization at the Packard plant, where this department forms an experimental factory in itself.

**Starts Manufacture of Steel Specialties**—Howard Mann, Bradley, Ill., who recently purchased the abandoned Burrell factory there, has begun the manufacture of steel specialties for motor cars. The old plant has been improved and altered, 10,000 feet of concrete floor being laid. Mr. Mann has

contracts aggregating \$50,000 which will take the output of the first year. New machinery has been installed and contemplated additions to the present line will give employment to 150 more men.

**Dodge Display at Fair**—Among the latest entrants as exhibitors in the Transportation Building at the San Francisco exposition are Dodge Brothers, whose display has just been installed at the fair.

**Supply Steel Balls to Twelve States**—The Los Angeles branch of the Ahlberg Steel Bearing Co. has placed an order for 100,000 steel balls, which is only the beginning for the Los Angeles house. The stock inventory shows 150,000 on hand, valued at \$25,000. The Los Angeles branch will keep stock on hand to supply the service stations of twelve states.

**Open New Tire House**—John F. Wiese, of Los Angeles, Cal., has gone back to the tire business. His retirement from the Winton branch in Los Angeles was announced recently when he formed a partnership with John G. Boss, formerly in the tire business in Denver. Operating under the name of Boss & Wiese, they will open a tire and repair business here.

**New Quarters for Chalmers Branch**—The L. H. Rose-Chalmers Co. is to distribute the Chalmers line in San Francisco, commodious quarters have been opened housing sales rooms and general office, while one of the largest and best equipped service stations in the West is located nearby.

**Federal Motor Contest**—Announcement has been made by the Federal Motor Truck Co., Detroit, that \$300 in cash prizes are offered to Federal owners for the fifteen best letters on "Why I Bought a Federal." The first prize is \$100; the second, \$50; third, \$25; fourth, \$15, and the balance \$10 each. The letters must not be longer than 500 words, and must be addressed to the Contest Editor, Federal Motor Truck Co., Detroit. The contest closes August 10.

**International Prospects**—Affairs of the International Motor Co., New York, are progressing favorably. The former internal difficulties between two groups of stockholders have been settled and other minor affairs satisfactorily consummated. Both foreign and domestic demand have improved, the large volume of exports having so increased the earnings of the company that the reorganization and scaling of capital that was thought necessary has been abandoned.

**Metal Floats for Export**—A letter to the Society of Automobile Engineers from Munster, Simms & Co., Belfast, Ireland, warns American builders of vehicles for export not to send over machines with cork carburetor floats because of the prevalent use of benzol fuel. It appears that while the shellac used to varnish these floats resists gasoline very satisfactorily, when benzol is used it speedily disintegrates and permits the cork to become logged. Benzol is the most popular motor fuel in Ireland.

**Patents Motor Wheel**—T. C. Benbow, Absarokee, Mont., is in Billings, Mont., arranging for the manufacture of motor car wheels on which he has secured a patent. With the first set completed he will equip a car and drive it to the Panama-Pacific Exposition, where he has arranged an exhibit. The wheel is constructed of a series of springs within springs, working in oil, and enclosed in airtight casings. These wheels are so designed as to permit of an equal distribution of weight upon each of the thirty-two springs that make up a wheel.

## Coming Motor Events

### CONTESTS

July 31—Speed races, Des Moines, Ia.  
July 31—Road race, Denver, Colo.  
July—Track meet, Allentown, Pa.

August 13—Track meet, Flemington, N. J.  
August 14—Dirt track races, Janesville, Wis.

\*August 20-21—Elgin road races, Elgin, Ill.  
August 21—Track meet, Ellenville, N. Y.

August 23—100-mile dirt track race, Kalazmoo, Mich.

September 4—Speedway races, Minneapolis, Minn.

September 6—Speedway races, Providence, R. I.

September 18—Speedway races, Chicago.

September 24-25—Track meet, Grand Rapids, Mich.

\*October 2—Speedway races, New York.

October 2—100-mile track races, Fresno, Cal.

October 2—Speedway races, New York.

October 1-2—Track meet, Trenton, N. J.

\*Sanctioned by A. A. A.

### SHOWS AND CONVENTIONS

September 13-19—Pan-American road congress, Oakland, Cal.

October 3-10—St. Louis show.

January 1-8—New York show.

January 22-29—Chicago show.

March 4-11—Boston show.



# Brief Business Announcements



**MILWAUKEE, Wis.**—Christman & Poole, state agents for the Burd piston rings, have changed their firm name to the Burd Ring Sales Co.

**Springfield, Mass.**—C. F. Rouze has been appointed sales manager of the Knox Motors Associates, an association organized to act as sole distributor of the product of the Knox Motor Co.

**Indianapolis, Ind.**—The Herrf-Brooks Corp. has appointed J. G. Carr and Paul Morford district sales managers. Mr. Carr has been with the National Motor Car Co., of Indianapolis, for some time; Mr. Morford with the Regal Co., of Detroit.

**Indianapolis, Ind.**—St. Clair Couzens, until recently advertising director of motor car advertising on the Chicago Daily Journal, which position he held 5 years, has joined the Pathfinder company here, as assistant director of sales and advertising.

**Syracuse, N. Y.**—C. A. Benjamin, formerly general sales manager of the motor car department of the American Locomotive Company, manufacturers of Alco cars, and later with the Fiat company, has been made New York state agent of the Apperson Motor Car Company. Mr. Benjamin is at present in

Syracuse and will probably make his headquarters here.

**Chicago**—The Auto Parts Co. has found it necessary to enlarge both its radiator and top departments.

**New York**—C. T. Kenworthy has been appointed eastern district manager of the Baker-R. & L. Co. He formerly was with the Rauch & Lang Co. as New York manager.

**Boston, Mass.**—Frank B. Donovan, who was associated with his brother, Joseph S. Donovan, handling the Studebaker line here, has gone to Baltimore, where he has bought out an agency.

**Racine, Wis.**—J. F. Crawford, master mechanic of the motor car department of the J. I. Case Threshing Machine Co., Racine, Wis., in charge of design, has resigned to become associated with the Curtiss Aeroplane Co., Hammondsport, N. Y., as chief motor designer.

**New Orleans, La.**—T. H. McGiehan, formerly vice-president and general manager of the Motz Tire & Rubber Co., Akron, O., has opened a large retail and wholesale accessory establishment here. Mr. McGiehan represents several leading manufacturers in the

southern states. The store and location is one of the finest in the city.

**Los Angeles, Cal.**—C. E. White, owner of the Model Vulcanizing Works, has formed a partnership with H. H. Holmes and opened a tire vulcanizing plant, doing business as the Olive Vulcanizing Works.

**New York**—T. E. Jarrard, vice-president of the Apperson Bros. Automobile Co., Kokomo, Ind., is in charge of the sales department here. Assisting him will be J. H. Newmark, who also continues in full charge of the advertising department.

**Los Angeles, Cal.**—W. T. Fishleigh, formerly at the head of the motor car department of the college of engineering at the University of Michigan, has been appointed head of the technical department of the local Apperson branch.

**Clintonville, Wis.**—F. H. Burdette, recently with the Standard Motor Sales Co., of Pittsburgh, Pa., and formerly district manager of the Neiberg company on the Pacific coast, has joined the sales force of the Four-Wheel Drive Auto Co. Burdette eventually will devote his time to the Pacific coast with headquarters at San Francisco.

## Recent Agencies Appointed by Motor Car Manufacturers

### PASSENGER CARS

Town	Agent	Make	Town	Agent	Make	Town	Agent	Make
Aberdeen, S. D.	K. O. Lee	Moline-Knight	Gordon, Neb.	J. M. McGraw	Moline-Knight	Perry, Ia.	King Automobile Co.	King
Malta, O.	Malta Auto & Supply Co.	Herrf-Brooks	Henry, Ill.	Henry Auto Co.	Cole	Philadelphia, Pa.	National Motor Co.	Herrf-Brooks
Alexandria, Minn.	H. N. Doyle	Oldsmobile	Hicksville, L. I.	Acme Garage	Oldsmobile	Providence, R. I.	J. A. MacDonald	Jackson
Ames, Ia.	Jacobson Automobile Co.	King	Huntington, L. I.	Carson Orcutt Sales Co.	Oldsmobile	Rockford, Ill.	Cadillac Auto Co.	Oakland
Baltimore, Md.	Wilson Motor Co.	Mitchell	Howells, Nebr.	Sindelar & Hanzel	Oldsmobile	Rockford, Ill.	Andrews Motor Co.	Lewis
Bartlesville, Okla.	Jack Shaw	Hupmobile	High River, Alta.	F. Pepper Garage	King	Rockford, Ill.	Andrews Motor Co.	Scripta-Booth
Battle Creek, Mich.	E. E. Doty	King	Hutchinson, Kan.	C. A. Livingston Auto Co.	King	Rochester, N. Y.	C. E. Hartson	Hupmobile
Beaumont, Cal.	E. D. Jones	Haynes	Hamilton, O.	Baxter Motor Car Co.	Oldsmobile	Ralston, Okla.	J. O. Cales	Hupmobile
Benton Harbor, Mich.	A. F. Messmer	Haynes	Hampton, Neb.	Will Van Housen	Oldsmobile	Richmond Hill, L. I.	Apex Garage & Rental Co.	Oldsmobile
Biloxi, Miss.	Biloxi Automobile Co.	Oldsmobile	Hancock, Ia.	Wiese & Nicolai	Oldsmobile	Rawlins, Wyo.	Michel M. Rubner	Chalmers
Bloomington, Ill.	C. U. Williams	Cole	Hendrick, Ia.	Thorne & Watts	Moline-Knight	Red Oak, Ia.	Renard Peterson	Moon
Bogue Chitto, Mass.	H. E. Brister	Oldsmobile	Hartford, Conn.	Parker Oldsmobile Co.	Oldsmobile	Red Deer, Alta.	Mechanical Garage	King
Boston, Mass.	F. P. Anthony	MacFarlan Six	Ionia, Mich.	Miller & Ashe	Oldsmobile	Rosebud, Mont.	Fred Bills	King
Breedsville, Mich.	Bert Lee	King	Jersey City, N. J.	J. Jacob Wacker	Oldsmobile	Richland Center, Wis.	E. L. Downs	King
Brock, Neb.	F. J. Schmidt	Studebaker	Jordan, Mont.	M. A. Bogle	Oldsmobile	St. Louis, Mo.	Motor Car Repair & Supply Co.	Elico
Brooklyn, N. Y.	Ready Auto Supply Co.	Oldsmobile	Jeannerette, La.	Arthur Wolford	Oldsmobile	San Angelo, Tex.	Ryan Auto Co.	Hupmobile
Carrington, N. D.	J. Buchanan & Sons	Hupmobile	Jefferson, Ia.	L. E. Jefferis	Moline-Knight	Sioux City, Iowa	W. L. Huffman Co.	Hupmobile
Cherokee, Okla.	F. P. Devin & Co.	Hupmobile	Knoxville, Tenn.	City Garage & Transfer Co.	Oldsmobile	St. Louis, Mo.	Mogul-Vulcan Sales Co.	Herrf-Brooks
Chester, N. Y.	Murry's Garage	Oldsmobile	Ludington, Mich.	Carter Auto & Garage Co.	Oldsmobile	Santa Ana, Cal.	R. L. Draper	Haynes
Carey, O.	Carey Auto Sales Co.	Oldsmobile	Long Beach, Cal.	B. O. Baldwin	Haynes	San Bernardino, Cal.	J. L. Warnecke	Haynes
Catskill, N. Y.	H. W. Lasher	Oldsmobile	Lorraine, O.	Brunk Machine & Forging Co.	Oldsmobile	San Diego, Cal.	Price Motor Co.	Haynes
Clinton, Ill.	L. De Boise	Moon	Ludington, Mich.	H. V. Huston	Oldsmobile	St. Thomas, N. D.	S. E. Peterson	Oldsmobile
Chicago, Ill.	E. D. Knowles	Moon	Langdon, Alta.	Roy Gowan	Oldsmobile	Stamford, Conn.	Mechaley Auto Co.	Oldsmobile
Chattanooga, Tenn.	Thrasher Automobile Co.	Oldsmobile	Lewiston, Mont.	Ford Auto Co.	Oldsmobile	Salem, Mass.	Oldsmobile Co. of Salem	Oldsmobile
Colfax, Wash.	A. J. Davis	Moon	Lewis, Kan.	J. H. Volkott	Empire	Sabetha, Kan.	G. E. Fitchell	Oldsmobile
Circle, Mont.	Ed Storm	King	Minneapolis, Minn.	H. J. Mich & Co.	Lexington	Spring Valley, Minn.	George H. Harris	Oldsmobile
Cincinnati, O.	Eureka Auto Co.	Oldsmobile	Minneapolis, Minn.	R. W. Munzer & Sons	Oldsmobile	Stettler, Alta.	Bentley & Son	King
Coral, Mich.	Thomas Kain	Dodge	Morgan, Minn.	Allen & Van Nest	Hupmobile	Schulenberg, Tex.	Dr. J. E. Clark	King
Coon Rapids, Ia.	Crow-Ribbith	Oldsmobile	Milwaukee, Ia.	E. C. Thompson	Chalmers	St. Louis, Mo.	Mogul-Vulcan Sales Co.	Herrf-Brooks
Canova, Ia.	J. A. Wick	Overland	Minneapolis, Minn.	F. Dittbenner	Oldsmobile	San Angelo, Tex.	Cain Bros.	Oldsmobile
Carlock, Ill.	Donat Widmer	Moline-Knight	Milwaukee, Ia.	Miles Deauval	Oldsmobile	Springfield, Mass.	Corson Berry Co.	Studebaker
Des Moines, Ia.	Hawkeye Motor Sales Co.	Princess	Midland, Tex.	E. Deauval	Oldsmobile	Wethby C. Waterfield	Welby C. Waterfield	Auburn
Duluth, Minn.	Mutual Auto Co.	Overland	Montgomery, O.	J. W. Pew	Oldsmobile	Standish, Mich.	A. Hanses	Maxwell
Denver, Colo.	Perry A. Mead	White	Midleton, O.	Howard E. Lanz	Oldsmobile	South Haven, Mich.	Jake Neffeneggar	Overland
Denver, Colo.	J. S. Morrison Auto Co.	Oldsmobile	Milno, Ia.	Bevis & Shartle	Oldsmobile	Schuyler, Neb.	Poll & Zeaman	Maxwell
Danville, Ill.	Raymond D. Smith	Moon	Miles City, Mont.	Wilson Bros.	Oldsmobile	Springfield, Neb.	Albert Compte	Maxwell
Duluth, Minn.	Zenith Auto Co.	King	Miles City, Mont.	E. Deauval	Oldsmobile	Troy, Ind.	Oscar Lippman	Moline-Knight
Des Moines, Ia.	Stewart & Schooler	Moline-Knight	Midland, Tex.	Manning & Yarborough	Oldsmobile	Tulsa, Okla.	J. T. Foster	Hupmobile
Evansville, Ind.	Chas. F. Hellman	Hupmobile	Montgomery, O.	J. W. Pew	Auburn	Tracey, Minn.	East Side Garage	Herrf-Brooks
Enid, Okla.	End Oldsmobile Co.	Oldsmobile	Millard, Neb.	Van Dohren Bros.	Oldsmobile	Troy, N. Y.	Thos. A. Nelson	Oldsmobile
El Dorado, Kan.	El Dorado Overland Co.	Oldsmobile	Momouth, Ia.	H. R. Miller	Moline-Knight	Tuxedo, N. Y.	Roherson Garage	Oldsmobile
Everly, Ia.	W. L. Kloppeburg	Overland	Maguoketa, Ia.	F. R. Rozak	Moline-Knight	Tulsa, Okla.	Smith & Densmore	Oldsmobile
Forreston, Ill.	Edward Paul	Moline-Knight	Manitowoc, Wis.	H. C. Schutte	Moline-Knight	Thibodaux, La.	Charles Y. Martin	Oldsmobile
Fairmont, W. Va.	Standard Garage	Chandler	Marion, Ia.	C. C. Carpenter	Moline-Knight	Tulsa, Okla.	W. C. Norris	Oldsmobile
Ft. Worth, Tex.	A. P. Mitchell Auto Co.	Hupmobile	New Haven, Conn.	Parker Oldsmobile Co.	Oldsmobile	Three Oaks, Mich.	Open & Hollenger	Oakland
Ft. Collins, Colo.	Casson & Hopper	Oldsmobile	Neosho, Mo.	Neosho Auto Co.	Studebaker	Topeka, Kan.	Palace Auto Co.	Paige
Fremont, Neb.	Hall & Steele	Maxwell	Nashua, Ia.	Neola Auto Co.	Oldsmobile	Urbana, O.	McAdams & McCrary	Oldsmobile
Flandreau, S. D.	Simmons & Francis	Moline-Knight	Niles, Mich.	H. C. Dunn	Oldsmobile	Violay, Wis.	Romer Kinder	Oldsmobile
Greenville, S. C.	L. P. Murray & Co.	Hupmobile	New Baltimore, Mich.	Stoll Bros.	Oldsmobile	Westerly, R. I.	S. H. Davis	Herrf-Brooks
Glenville, Minn.	Lang & Lukes	Oldsmobile	New Baltimore, Mich.	Vosson & Son	Oldsmobile	Woonsocket, R. I.	Fuller Bros.	Herrf-Brooks
Genesee, Ill.	E. G. Orr	Moon	Owatonna, Minn.	Sander Bros.	Oldsmobile	Waterloo, Ont.	Hubert I. Dietrich	Oldsmobile
Greenfield, Ia.	Wilson Bros.	King	Oktokos, Alta.	Okotoks Garage	King	Worcester, Mass.	Jernberg-Wheeler Co.	Grant
Granum, Alta.	W. P. Byer	King	Opelousas, La.	P. King	Oldsmobile	Winfield, Kan.	Collision Auto Co.	Buick
Gleichen, Alta.	John Boxy	King	Osborne, Kan.	Gilbert & Sons	Reo	Waldron, Kan.	A. Grasser	Moline-Knight
Glenlive, Mont.	J. Wiegelds	King	Periora, Ill.	Zoller & Zoller	Chalmers	West Dennis, Mass.	H. W. Nickerson	Oldsmobile
Grand Rapids, Mich.	Reid Auto Co.	Auburn	Plainview, Tex.	Hubbard Bros.	Hupmobile	Woonsocket, R. I.	Fuller Bros.	Herrf-Brooks
Glidden, Ia.	E. O. Potter	Oakland	Philadelphia, Pa.	National Motor Co.	Oldsmobile	Westerly, R. I.	S. H. Davis	Herrf-Brooks
Grand Rapids, Wis.	C. L. Duncan	Moline-Knight	Pasadena, Cal.	J. C. Lavene	Haynes	Willmar, Minn.	P. M. Peterson	Oldsmobile
			Pinedale, Wyo.	J. F. Paterson	Oldsmobile	W. New York, N. Y.	West Shore Garage	Oldsmobile
						Yonkers, N. Y.	Iowa's Garage	Oldsmobile
						Yorkton, Tex.	Gus Zedler	King



# The Motor Car Repair Shop



## Periodic Inspection of Motor, Wheels, Steering, Brakes, Etc.

LIKE any other piece of machinery, the motor car should be inspected periodically to see that every part is in proper working order and to detect, wherever possible, loose nuts, improperly adjusted apparatus, etc., in plenty of time to prevent mishaps on the road.

So important do most of the motor car makers consider this periodic inspection that they have in many cases laid down special rules in the matter for their dealers to follow, the aim being to conserve the efficiency of the vehicles through detecting mechanical disorders in time to prevent their growing into serious maladies.

These days, when a man buys a car, he usually is accorded a certain amount of this inspection and adjustment service free of charge, but it is well for him to take a lesson from this effort on the maker's part and later, when the gratis service runs out, continue its routine himself at regular intervals, thus forming a habit of following the old proverb of a stitch in time.

About every 2 weeks, the car should be gone over carefully, grease cups examined, brake adjustments looked into, clutch action checked up, wheels inspected and the many other points about the mechanism tested to see that everything is as it should be. To this end, it might be well for the owner to set down a regular inspection routine to be followed out once in 2 weeks. He might take the following as an outline:

### Routine of Inspection

**Start with the motor**—Clean the spark plugs and check up the distance between the terminals, which should not be over the thickness of a dime. Drain oil in crankcase and put in new oil. Go over bolts and nuts with a wrench and tighten loose ones. Test compression by turning motor over slowly by hand when the ignition current is off. If one cylinder is weaker than the others, look at its valves. If all are weak, excessive carbon may be expected on the valves, this preventing their proper closing. Or, the tappets may not be properly adjusted, holding the valves slightly open when they should be completely seated. Remember that the longer carbon is allowed to stay on the valves, the harder it will be to grind them to accurate seats again, for the deposits pit them deeper and deeper. See that there are no oil leaks, and also examine the water connections.

**Radiator**—Look over the core of the radiator, and if rust places are found, take steps to have the leaks that cause them repaired at once before they get any larger. See that the overflow pipe from

the radiator is open, as sometimes radiator leakage has been caused by clogged drain pipes preventing steam escapage, with the result that the pressure caused a leak. Run water through the cooling system with a hose for a few minutes to wash out sediment so far as possible.

**Electric system**—Examine all wiring to see that the insulation is good. Tighten terminals that are loose. See that no wires

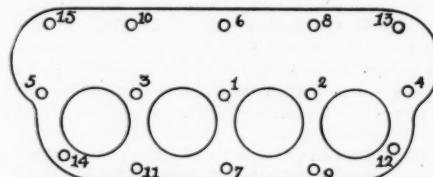


FIG. 1—TIGHTENING CYLINDER HEAD  
The nuts should be tightened in numerical order

are being chafed through rubbing on sharp surfaces. Look at the storage battery, putting water in the cells wherever the plates are uncovered. Read the cell gravity with the hydrometer, and if any of the cells are strikingly lower in reading than the others and below normal gravity, the battery should be removed and those cells brought up to proper charge individually.

**Brake system**—Test all parts of the brake assembly. Examine pins and clevises and see that none of the bearings is frozen by rusting. Look at the condition of the brake lining and see that the action is uniform on operation of the pedal or lever. See that pins and nuts are properly locked by cotter pins or whatever other special means is used. Oil the bearings.

**Spring system**—Look carefully at the spring bolts and shackles, and tighten loose spring clips. The latter is very important as it is a common source of breakage. See that all leaves are free to act and not rusted together. Examine for alignment of the leaves.

**Steering system**—Look at all joints and connections carefully. See that there are no loose connections in cross-rod, reach-rod or elsewhere. Play is a bad thing in the steering connections as it causes wear. Steering connection nuts and bolts should be properly cottered or otherwise locked. Examine for excessive play in the steering wheel. One-eighth turn is all there should be.

**Wheels**—Grasp the top of the wheel and attempt to move it sidewise to test for lost motion or play in the bearings. When jacked up free of the ground, the front wheel should turn freely backward or forward but without any side play. If there

is looseness sidewise, the wheel should be removed and bearings inspected for wear. Wheels should be greased in any case after from 2,000 to 3,000 miles.

**Tires**—Look them over carefully for cuts and bruises of a serious nature. Remove any foreign substance that might work into the tire. See that extra tire and tubes are dry, and that they are not being chafed by straps or tire irons. Plug up all cuts, even if they are only  $\frac{1}{8}$  inch long.

**General**—Examine all grease cups to see that they are properly filled, and that passages from them to the bearing surfaces are unobstructed. Never let grease harden and cake in the grease grooves or passages. Such neglect soon renders the grease cup useless. Examine all body, fender and running board bolts, and see that the lamp brackets are rigid and that the windshield is firmly in place. See that muffler and connections to exhaust manifold are tight.

### Detachable Cylinder Heads

Detachable cylinder heads now are quite generally used, and it is very important in connection with them that they are kept tight against leakage at the joint with the main cylinder casting. A striking loss of power in a certain engine was puzzling until a thorough inspection revealed that some of the head bolts were loose, allowing some of the compression pressure to escape.

There also are many instances of careless tightening of heads and cylinder blocks which have resulted in cracking the casting. This is due to drawing down one bolt or series of bolts too tightly before equalizing the strain by tightening others in another part of the casting. The object is to pull the casting down uniformly without any tendency to bend or distort the piece.

The diagram given in Fig. 1, which is published by the Dort Motor Car Co. for the special edification of the users of its cars, which are equipped with detachable head engines, is a lesson in itself. In this case, the cylinder head has fifteen bolts, and the numbers on the diagram indicate the order in which they should be tightened. It will be seen that the center bolts are adjusted first, then the rest are tightened alternately going across the head from one side to the other so that the head will be held down firmly all around.

This gives the advisable procedure to follow, and regardless of exact number of bolts, the general idea is the same. Slight care of this kind will often save many dollars for repair or replacement of cracked castings.



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As resilient as a pneumatic. Cannot puncture or blow-out. Fits all standard clincher rims. Makes your car safe and enjoyable.

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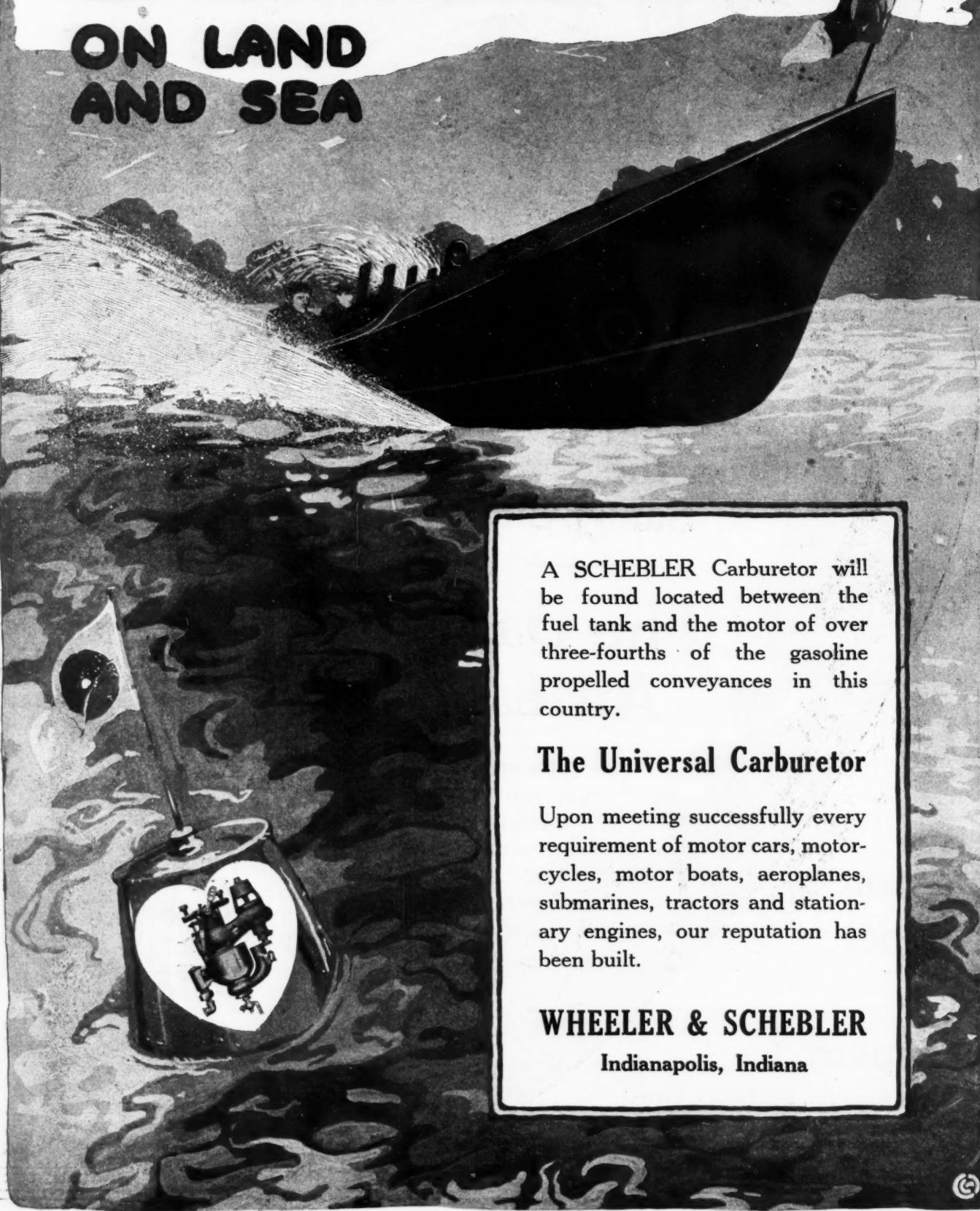
cover  
half  
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Punctures  
are now  
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You'll get them  
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not now? Big  
money-makers for the  
dealer.

# SCHEBLER.

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AND SEA



A SCHEBLER Carburetor will be found located between the fuel tank and the motor of over three-fourths of the gasoline propelled conveyances in this country.

## The Universal Carburetor

Upon meeting successfully every requirement of motor cars, motorcycles, motor boats, aeroplanes, submarines, tractors and stationary engines, our reputation has been built.

**WHEELER & SCHEBLER**

Indianapolis, Indiana



10%

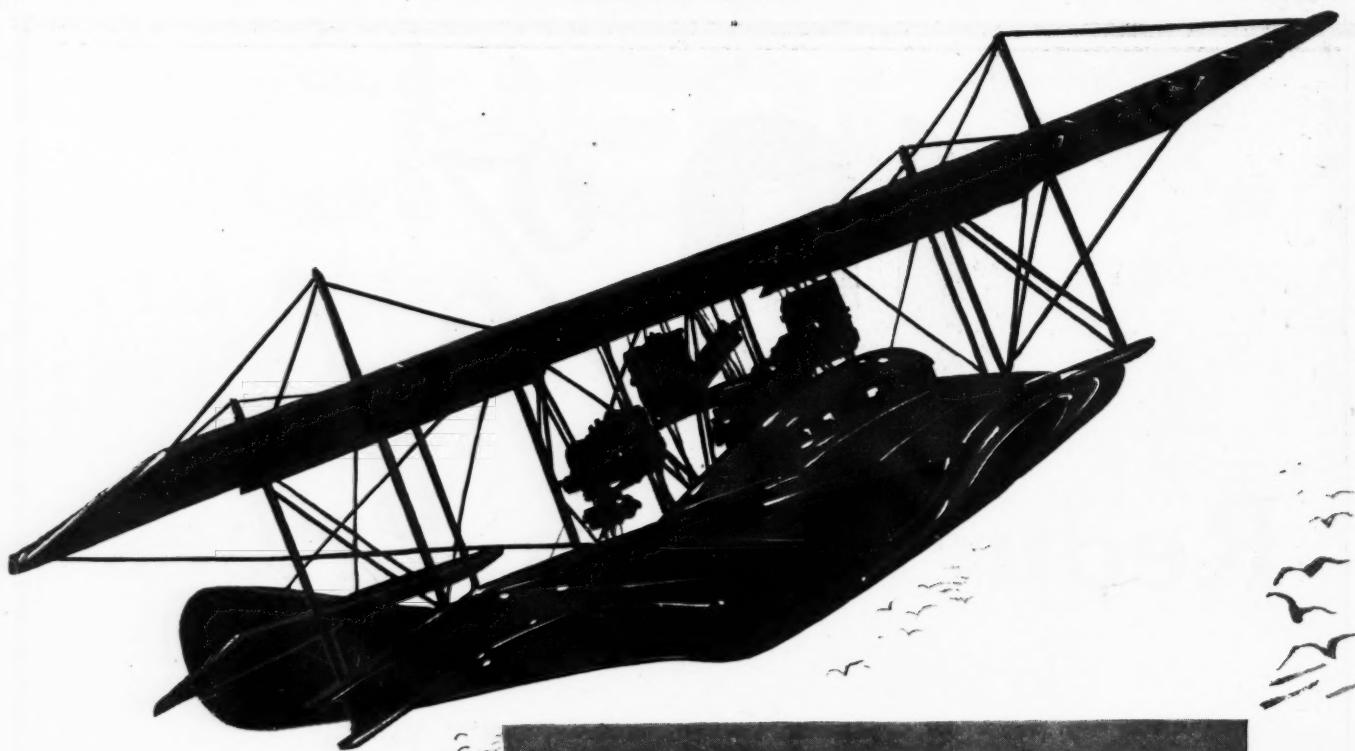
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One Quality Only—the Best  
“AS USUAL”

*Get Reduced Prices  
from*

**MICHELIN STOCKISTS  
EVERYWHERE**





### For Your Aeroplane, Automobile or Motor Boat

NO matter under what conditions motors work, their needs are pretty much the same. Up in the air, on the road or on the water, in order to have a smooth-running motor that delivers its maximum power, you need a high quality lubricant.

For safety, pleasure and economy, you need an oil that retains its body under heat. Its point of flash must not be too low, else it will be destroyed as a lubricant before it passes the piston rings and reaches the heat of the combustion chamber. It must not have too high a flash, else, when once in the combustion chamber the temperature will be too low to consume it, and it will char, causing carbon deposits on piston and cylinder heads and gumming of the piston rings and valves and valve seats. It should have a low cold test, so that it will flow freely and lubricate fully in zero weather. And lastly it should not be prohibitive in price.

Texaco Motor Oil fills the bill.

You can get it at good garages everywhere in 1 and 5 gallon cans.

Get a free copy of *Motor Miles*; well worth reading by every motorist.

THE TEXAS COMPANY  
New York City

# TEXACO MOTOR OIL

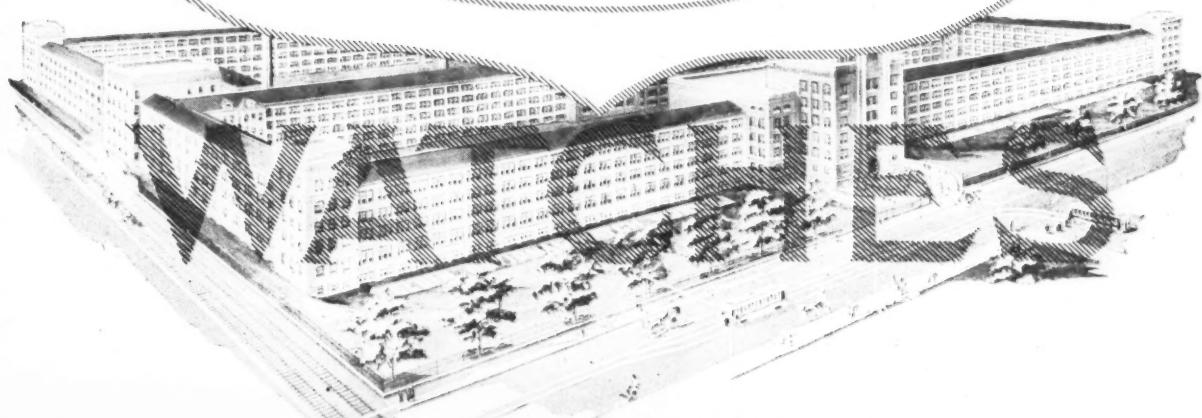
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**Elgin National  
Watch Works**

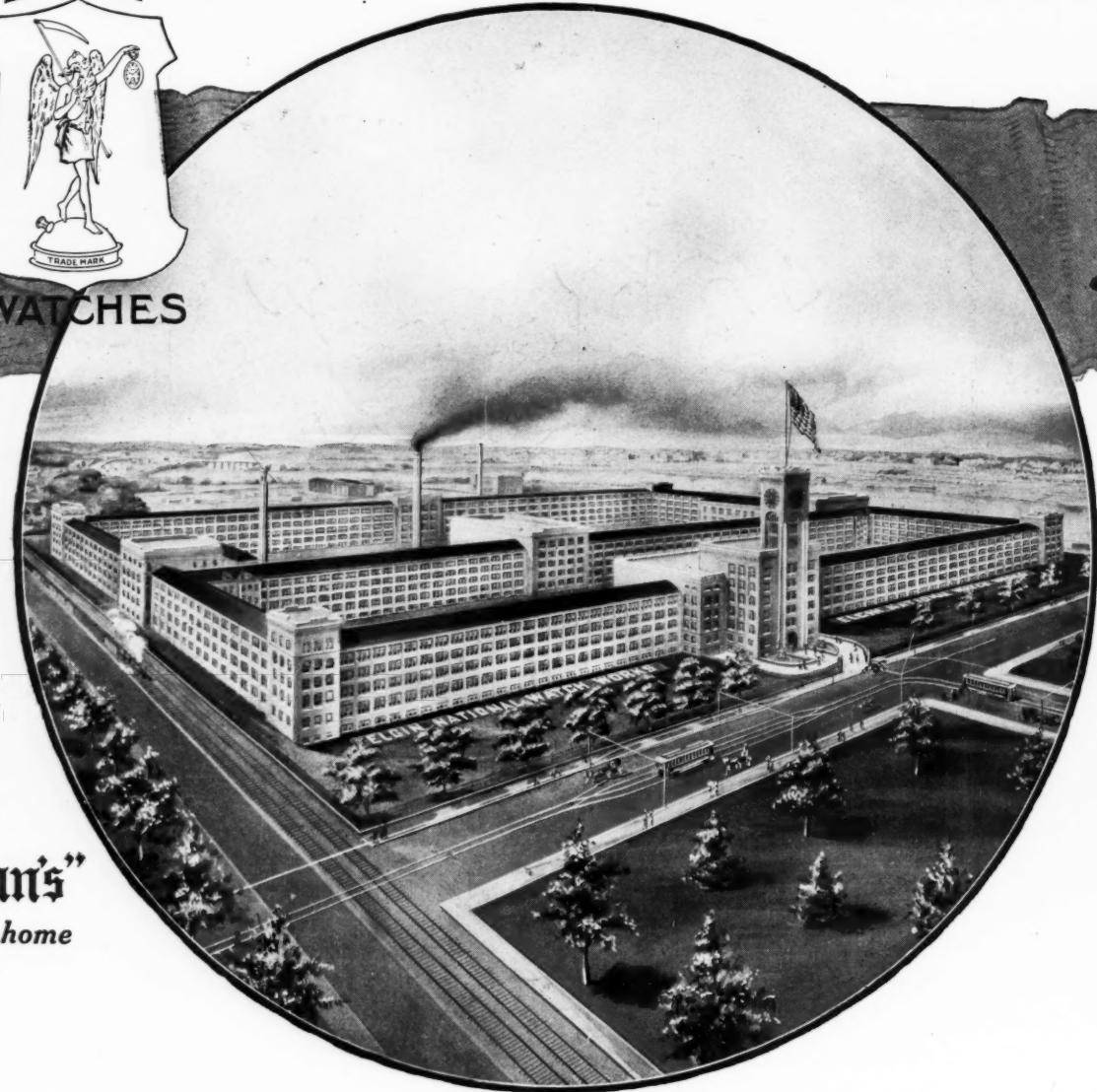
TRADE MARK



*Built Like an Elgin Watch—By Watch Makers*



**"Van's"**  
*new home*



**V**AN, the world's most accurate, most reliable speed-meter, beginning with the first of August will be manufactured by the Elgin National Watch Works, makers of the world's most accurate, most reliable timepieces. The importance of this alliance to car manufacturers, dealers and motorists is self-evident.

The same confidence that Van inspired in every motor car engineer, who ever gave him a ride, Van inspired in this nationally-famous concern whose watchwords for 51 years have been "Precision-Performance-Perfection."

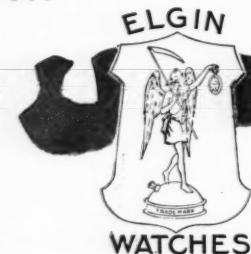


**Van**

*the Speedmeter  
with the big  
black figures*

**V**AN was recognized as pedigreed stock—a speedmeter which told speed and distance as infallibly as a "Lord Elgin" told time—a "14-karat, 27-jeweled" speedmeter worthy the unqualified support of a reputation over half a century in the making.

Elgin watches date back to the Civil War. Over 18,000,000 of them are now in circulation. Van, though little over a year old, is standard equipment on several leading makes of automobiles and in the service of tens of thousands of satisfied motorists. And both instruments—one of time, one of distance—are landmarks of success.



The policy of the Elgin National Watch Works has always been "to produce a fine watch at the lowest possible price."

In taking over the manufacture of Van, the same policy will hold—the production of a **superior speedmeter at the lowest possible price**. We have the speedmeter—they unlimited facilities and 50 years' experience in a kindred line of manufacture. We have lately been unable to accept new business—have been forced to refuse several large contracts. We couldn't build Van fast enough. We outgrew our factory extensions no sooner than we were housed in them. Shortly after the first of August, however, we shall have an **unlimited capacity**.

If you are considering future equipment now—better let Van figure with you. If you are not already acquainted with Van—the unique pneumatic principle upon which he operates—his infallibly accurate propeller shaft drive—his few parts, astonishing simplicity and trouble-proofness—his legibility—and non-fluctuating features—write us for complete information.

*Free Booklet Sent on Postal Request*

## THE VAN SICKLEN COMPANY GENERAL OFFICES:

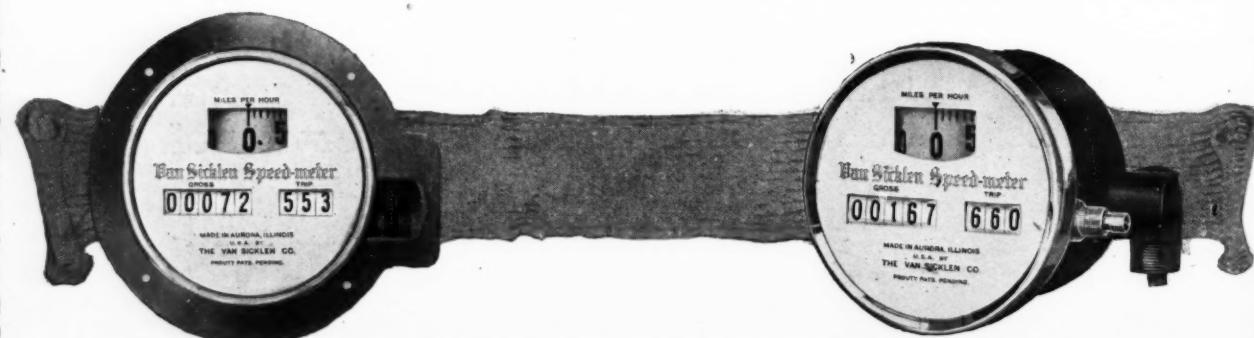
ELGIN, ILLINOIS

Factory Representatives: Cutting, Armstrong & Smith Sales Co., Detroit, Mich., for the States of Michigan, Ohio and Indiana

General Distributors: The Beckley-Ralston Company, Chicago

Eastern Distributors: A. J. Picard & Co. 1722 Broadway, New York City

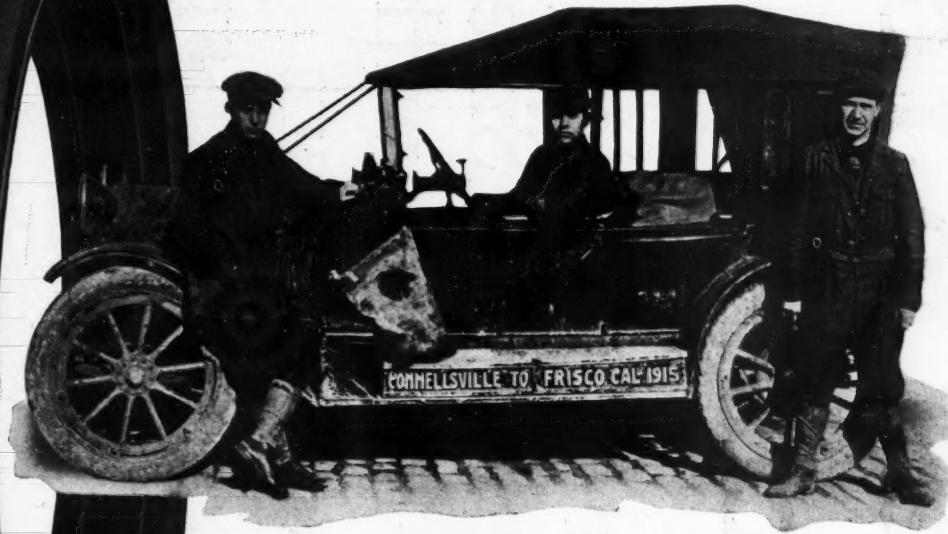
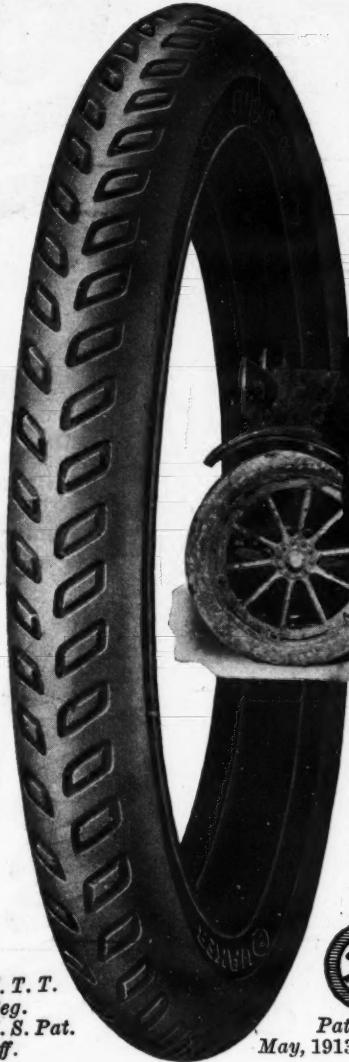
Foreign Distributors: Mestre & Blatge, 20 Store St., Tottenham Ct. Rd. W. C., London, England



*Built Like an Elgin Watch—By Watch Makers*

# PENNSYLVANIA TO CALIFORNIA

On a Set of Stock Tires  
Purchased from a Dealer



"After a hard and long trip from Pennsylvania to San Francisco, Cal., through eleven states, over the worst roads in the U. S., plowing through mud and through the rock roads of Arizona, through river bottoms and canyons, making thirty-six hundred (3600) miles, it is wonderful to see what QUAKER TIRES will stand. We had no blow-outs and only had three punctures.

"Just wish I could show them to you now. We are still running them, and they look almost like new ones."

(Signed) W. O. BISHOP.

San Francisco, Feb. 16, 1915.

T. T. T.  
Reg.  
U. S. Pat.  
Off.

Pat.  
May, 1913

TRADE MARK  
**QUAKER TIRES**  
REG. U. S. PAT. OFF.

Let your speedometer judge these tires—watch it reel off thousands of miles of city streets and country roads while you ride on in comfort without fear or thought of tire trouble. You will be surprised to see the excess mileage pile up while still these tires of our wonderful TEMPERED rubber retain their body, toughness, elasticity, resiliency and durability—notice how they absorb shock.

For more than three years QUAKER TIRE users have been getting more mileage than they paid for—why don't you?

The T. T. T. tread is another exclusive QUAKER feature. It is scientific in every respect, offering tremendous resistance to lateral-motion when running and materially assisting the travel of the machine.

"T. T. T. grips and never slips."

### Live Dealers, Listen!

National advertising, a square-deal policy and sales helps make our proposition a winner. Write Quick. Address Mr. Moore.

### Sold Everywhere

If not by your dealer, then, direct from our factory or branches, until your dealer does stock QUAKER TIRES. Write today. Address Mr. Lyons.

## QUAKER CITY RUBBER COMPANY

Factory and Home Office: Philadelphia

PHILADELPHIA  
629 Market Street

CHICAGO  
182 West Lake Street

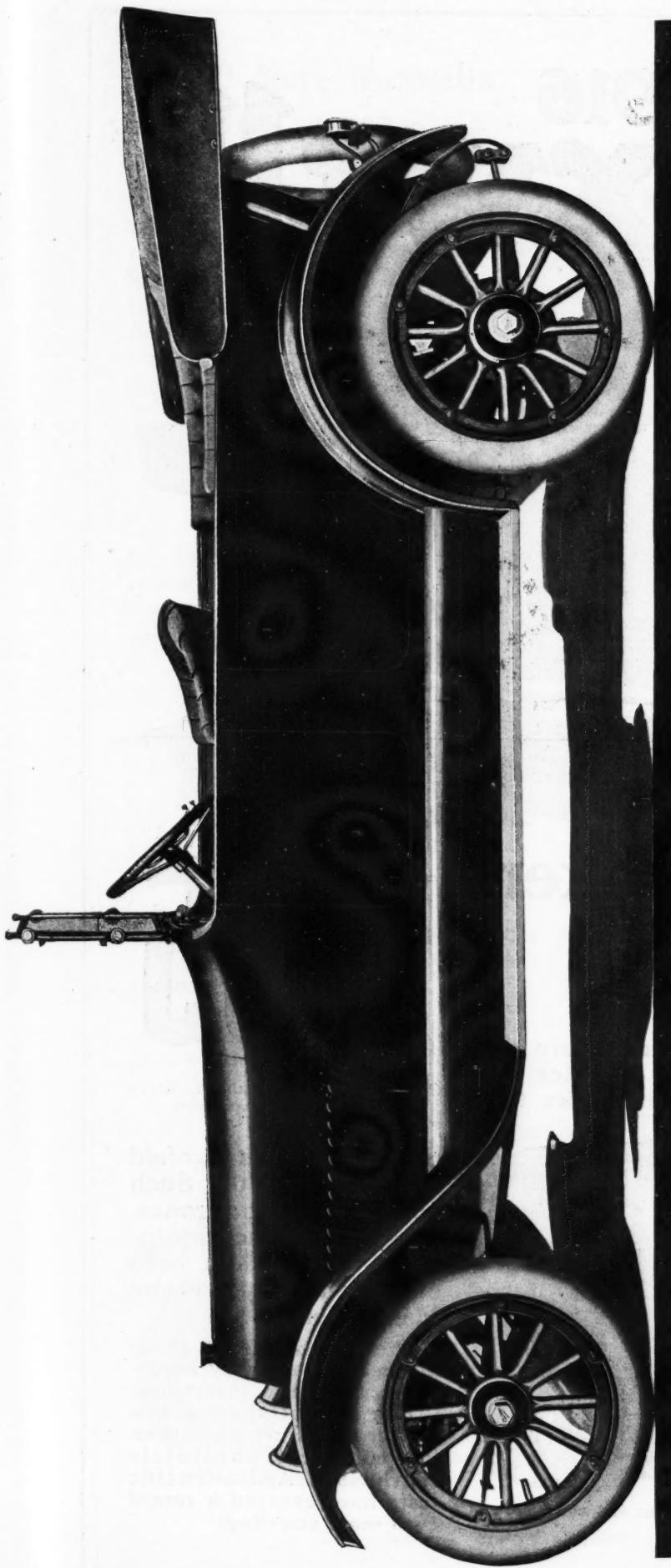
PITTSBURGH  
211 Wood Street

NEW YORK  
207 Fulton Street

# If You Were a Marion Dealer You Could Say to Your Prospects—

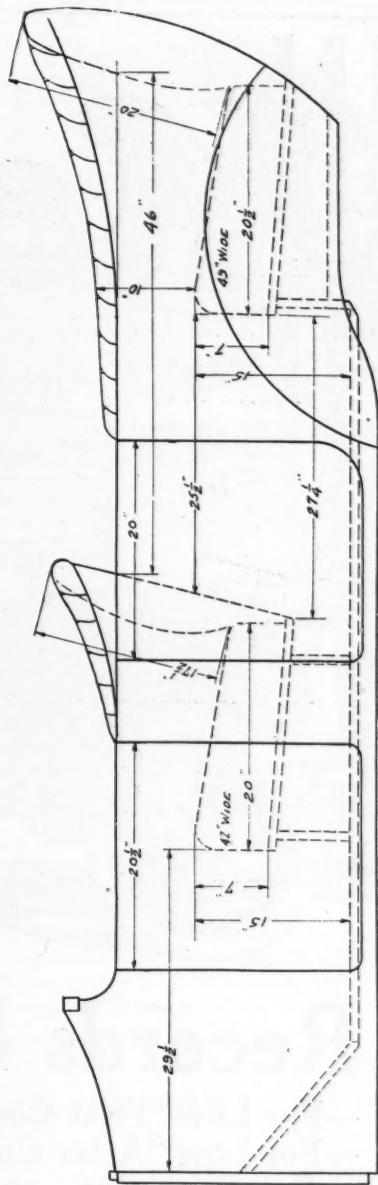
Why wait for your car when you can get the best of all the Sixes to drive away today—Marion with its large, roomy, French stream line body, long wheelbase, high-speed motor, is the best buy of the Sixes

**1916 Marion SIX \$1185**



## Specifications

Weighing but 2600 pounds with a wheel base of 120 inches, this new Marion is driven by an Americanized foreign type high-speed 3x5 six cylinder motor, with unit power plant, producing a flexibility which gives smooth running on the road from three to sixty miles per hour, with maximum mileage per gallon of gasoline. The full power generated being transmitted to the rear wheels through a straight line drive and double universal to the Brown-Lipe helical bevel differential, the newest thing in rear axle construction. These new Marions are electrically lighted and started by the latest Westinghouse equipment. The underslung, long, flat, broad, rear springs insure the easiest riding. Accessibility to all parts has received expert consideration. The tendency of later-day body designing has been to shorten up the leg room in the front and narrow the cushion sizes both front and rear. With the Marlon we have worked to obtain the opposite result; viz., excessive leg room, excessive width of cushions and extreme luxuriance. The rear seat is 49 inches wide and is the largest found in this type of car, and compares favorably with the largest motor cars built in America. The front seat, to which this also applies, is 42 inches wide.



The detail drawing gives all body dimensions. Take your measuring tape and compare it with Marion's competitors

## Marion Department

# MUTUAL MOTORS COMPANY

Jackson, Mich., U. S. A.



## All Records Broken

- For Low "First Cost"
- For Low "After Cost"
- For Big Sales—and Profits.

THE 1916 Maxwell is more than ever before the dealer's golden opportunity. It doubles the buying value of every dollar and multiplies the

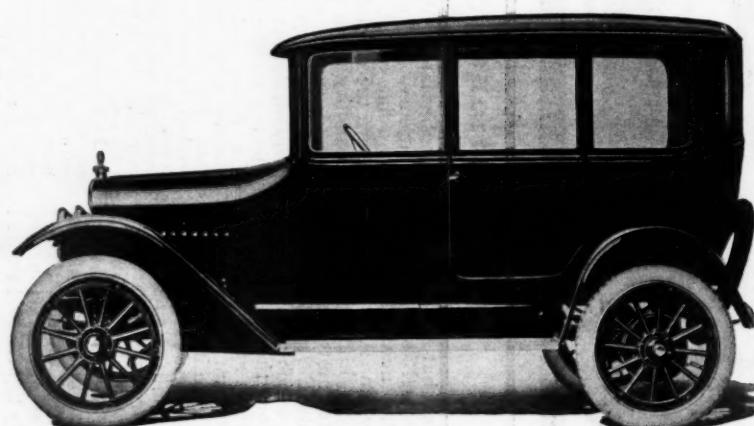
**\$655**

f.o.b. Detroit

Completely equipped including Electric Starter, Electric Lights

possible buyers twofold—yes threefold. Such power, such endurance, such beauty, such equipment, has seldom been equalled at twice the Maxwell price.

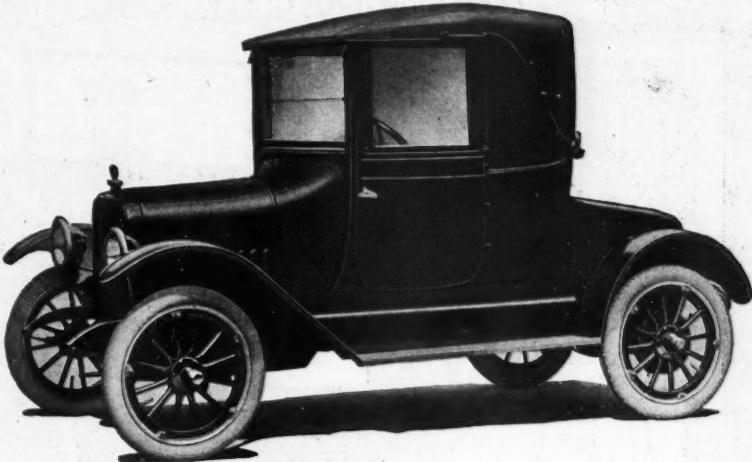
The performance of 48,000 Maxwells—on every road—in every weather—everywhere—has established a low "After Cost" record—amazing, consistent, absolutely convincing. And scientific tests have created a record even more startling.



Maxwell Permanent Top Convertible Body, for summer and winter use  
\$935 with complete equipment

## 60,000 More Maxwells this season

60,000 sturdy, powerful, dependable, handsome automobiles that will *create their own market* through superior construction, handsome appearance, many new features—and a very low price. And good dealers from sea to sea and beyond have been writing—wiring—calling—for particulars on what Maxwell would do for 1916. Here's the answer.



Maxwell 2-passenger Cabriolet—\$865 with complete equipment

## One Chassis—Five Body Designs

Every Maxwell dealer can supply a 1916 Maxwell to answer every requirement. *The line is positively complete.* 5-passenger Touring Car—2-passenger Roadster—2-passenger Cabriolet—6-passenger Town Car—and a 5-passenger Permanent Top Convertible Body—all handsomely designed and finished—and built for comfort—for service.

## All Included for the Price

Electric Starter  
Electric Lights  
Demountable Rims  
High-tension Magneto  
One-man Mohair Top

New Streamline Design  
Wider Front and Rear Seats  
Handsome Rounded Radiator and Hood  
Improved Instrument Board with all  
instruments set flush

Every feature and refinement of cars selling at twice the Price.

Get in with the real prosperity agent—The Maxwell—**NOW.**

At the present time some  
territory is still open.

If you are *alive* and  
want the real 1916 agency  
proposition, don't write—  
wire



Maxwell 2-passenger Roadster—\$635 with complete equipment

**Maxwell Motor  
Company, Inc.**

Detroit,  
U.S.A.

**The New Series Lewis "VI" now \$1390**

The principle of "value received" has triumphed. Every buyer of a Lewis Six automobile has been enthusiastic in his praise of its beauty and efficiency. As a result sales have become almost unbelievably large.

**LEWIS "VI"**  
*Monarch of the Sixes*

This big output has so greatly reduced manufacturing and selling costs as to permit an appreciable reduction in price. You can now buy a New Series for \$1390 and at this price you get the same big, beautiful, efficient automobile that thousands have paid \$1600 for—and you get many added refinements.

**To Dealers In Open Territory**—with the Lewis Agency you can do a bigger and more profitable business. Write today for our interesting proposition.

**SPECIFICATIONS**

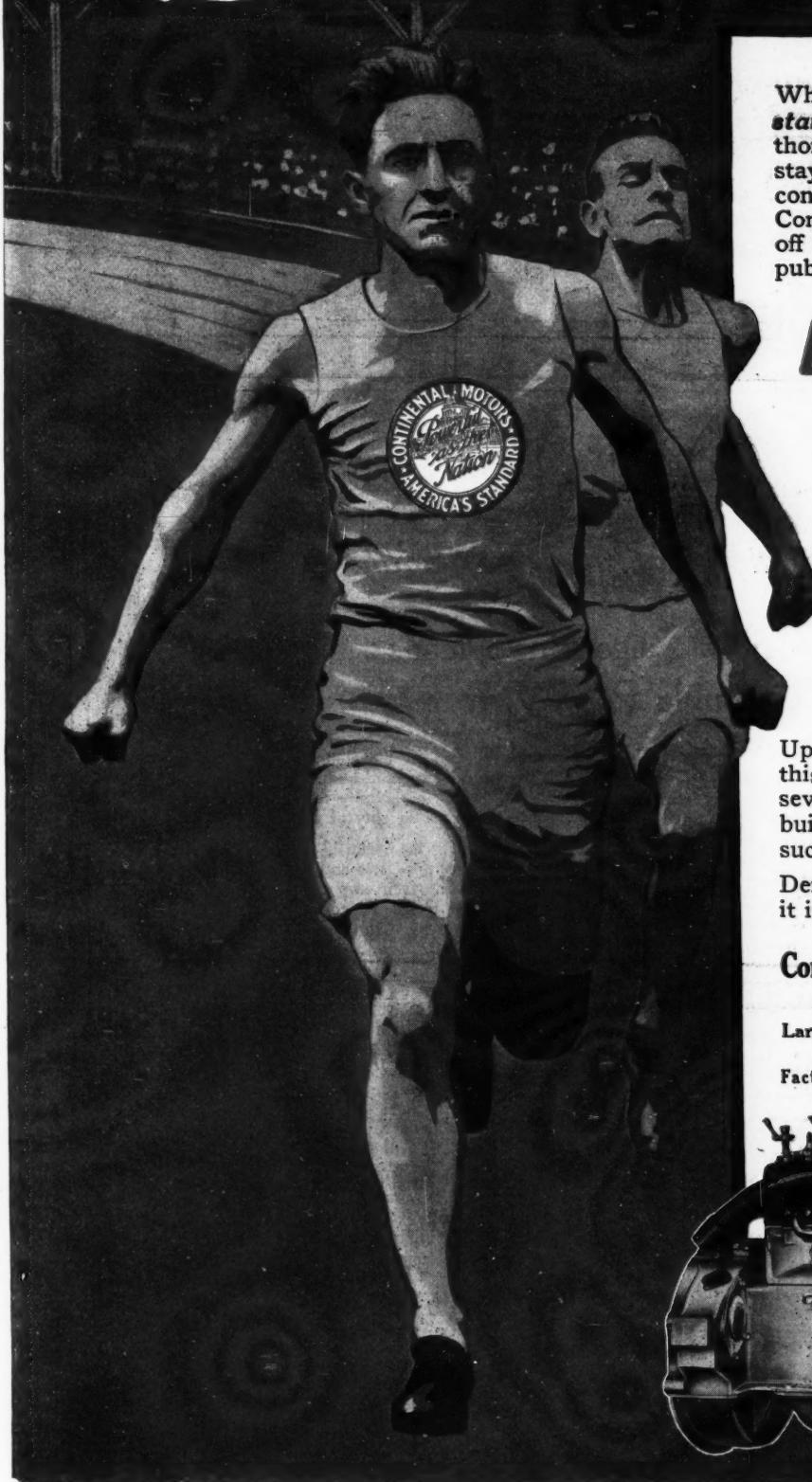
56-inch underslung rear springs, easy riding and comfort on country roads. Reserve gasoline supply—Stewart vacuum feed—Remy Starter—Stromberg new type Carburetor—Stanweld Rims—Power Tire Pump—Crown Fenders.

The Magnetic Gear Shift, manufactured by the Cutler-Hammer Mfg. Company, makes the Lewis as easy to drive as an electric coupe; no stripping or clashing of gears. Optional equipment at \$150.00 extra.

1200 fewer parts and a car of "class" from radiator to tail-light.

**L. P. C. Motor Co.** <sup>60</sup> Cram Street **Racine, Wis.**

# Stamina



Whether in men or in motors, **stamina** is the mark of the thoroughbred. For real **stamina**, staying power under severe conditions of stress or load, Continental Motors easily carry off the honors in the race for public preference.

## *Continental* Motors

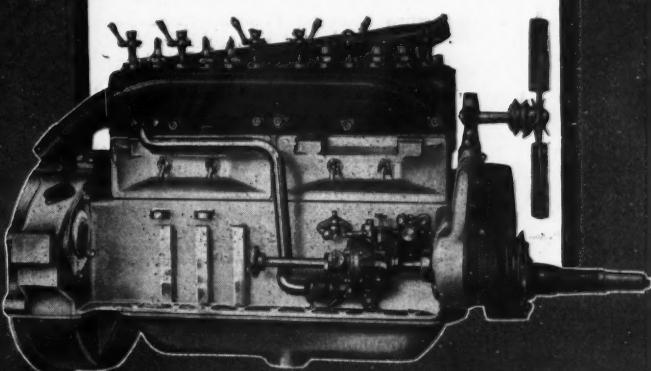
Over one hundred and forty manufacturers of trucks and pleasure cars now use the Continental Motor. Built in various models and sizes to meet their different requirements, it embodies always that pre-eminent quality  
—Continental **Stamina**.

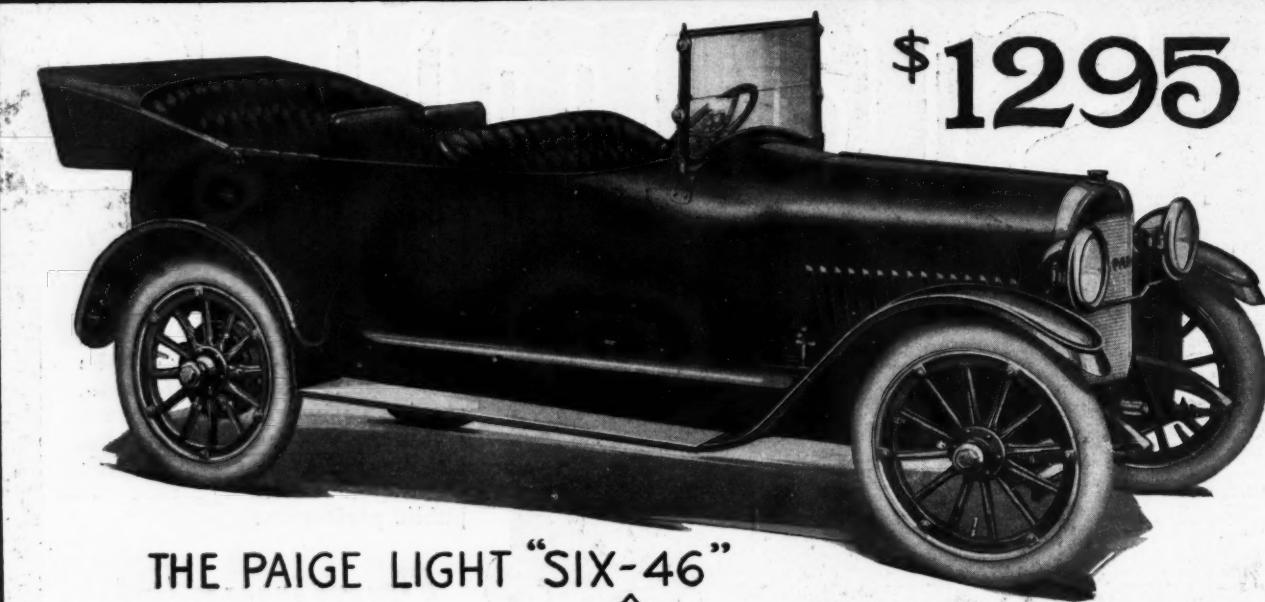
Upon the standard values of this world-famous motor, these several score manufacturers build a surer, a more enduring success.

Demand Continental **Stamina**: it insures lasting satisfaction.

**Continental Motor Mfg. Co.**  
**Detroit, Michigan**

Largest Exclusive Motor Builders  
in the World  
Factories: DETROIT, MUSKEGON, MICH.





THE PAIGE LIGHT "SIX-46"

# PAIGE

*The Standard of Value and Quality*

## The New Paige Line Means A Double Paige-Victory

Above you see them both—the new Paige "Sixes."

The epoch-making Paige "Six-46," the big seven-passenger car, the most popular, the best selling "Six" of the year, the season's sensation from the hour it was introduced last January—now an even greater car, a more beautiful car, a more extraordinary Value at the New Price—\$1295.

And the new Paige Light "Six-36," a five-passenger car embodying all the elements of Paige beauty, luxury, distinction and wealth of highest grade features—for \$1095.

### Think What That Line Means to Paige Dealers—Two Paige Leaders in the Field!

As an intelligent and alert Dealer, you know the prestige and unquestioned supremacy of the Paige "Six-46"—when it was sold for \$1395. But you must know the new Paige "Six-46"—at the new price—\$1295. You will see that all the vital victory-winning elements are preserved. But you will also find that the car is even more beautiful, even more invincible against all competition than it was before—at \$100 less in price—for greatly increased quality.

You will see this in the stunning effect of the genuine French Glaze hand-buffed leather, in the Pantasote top, which add vastly to the smartness as well as the service and quality of the car.

You will see this in the beautiful enduring lustre of the painting, the most expensive and painstaking painting job that can be given any car—at any price, with the body in Paige Richelieu blue and the wheels set off in a warm red.

The Paige Light "Six-36" is just as extraordinary.

This is a five-passenger reproduction of the "Big Six." It is Paige Design, Paige Beauty, Paige Character throughout. The high-grade leather upholstery, the beauty of finish, the lightness of the car (scarcely 2600 pounds), the power and flexibility of the motor, the electric equipment, all the extraordinary combination of highest grade features that mean Paige Quality unrivaled are to be found in this peerless Paige Light "Six-36"—at the amazing price—\$1095.

Can the experienced and successful Dealer, who knows his market, who knows values and who knows the Stability and Success of motor car manufacturers think of a more promising or a more profitable line than these two unchallenged Paige "Sixes"?

# PAIGE

*The Standard of Value and Quality*

## A Word To All Dealers

Tremendous changes have come about in the motor car market these last six months—particularly these last six weeks. To meet Paige competition, to cope with Paige Supremacy in the Moderate-Price Six field, manufacturers have cut and are cutting their prices in a most spectacular way. We prophesied last January that the Paige "Six-46" would "establish new Six standards and set new Six prices." You know whether that prophecy has come true. Also you know that the mammoth Paige plant and Paige production have been doubled.

You know whether cuts in prices sometimes mean cuts in quality. You know—as Dealers—where to look for such cuts in quality. Your experience tells you whether character and value have or have not been sacrificed—to price. Look closely into your new-priced cars and your competitors' new-priced cars. Satisfy yourself that the vitals of quality are there. Take nothing for granted. Be sure.

Then, look at the Paige "Six-46" at the new price—\$1295.

Satisfy yourself that the Paige "Big Six" is not only as good a car as it was when it swept the country—at \$1395—but actually and honestly a better car—a still more wonderful "buy"—at \$1295.

Paige challenges the world.

We mean that literally. Paige Quality is builded upon the bed-rock of Paige Policy which means Paige Character, Paige Stability and the "Standard of Value and Quality."

As a Dealer you know of the overwhelming Success of Paige Cars. As a Dealer you know of the impregnable financial strength, the liberal policy and the high selling and manufacturing ideals of the Paige-Detroit Motor Car Company. As a Dealer you know that the Paige plant and Paige production have been doubled to meet the popular demand for Paige Cars.

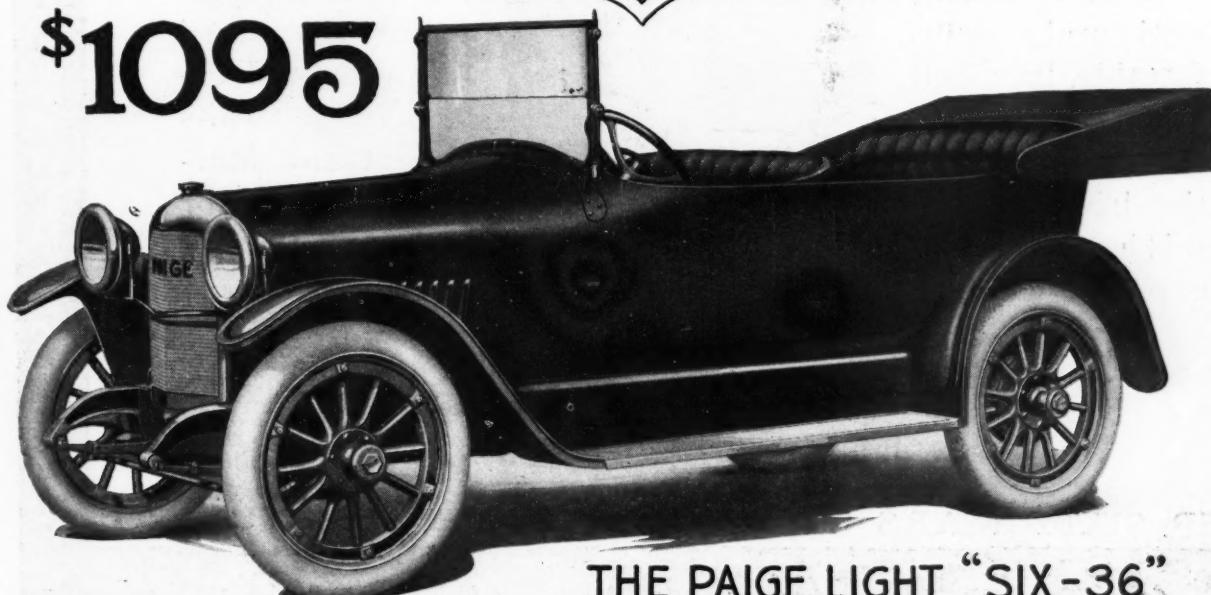
As a Dealer, you will be quick to grasp the unequaled possibilities for you in the Paige line this coming year—the season's success—the "Big Six" at \$100 less—strengthened by another epoch-making Paige "Six"—at \$1095.

The successful Dealer is the one who associates himself, not with a flashy sensation, but with a strong, powerful, permanent Company that means year-after-year success. You know that is the Paige.

This is another "Paige Year."

Paige-Detroit Motor Car Company  
1252 McKinstry Avenue, Detroit, Michigan

**\$1095**

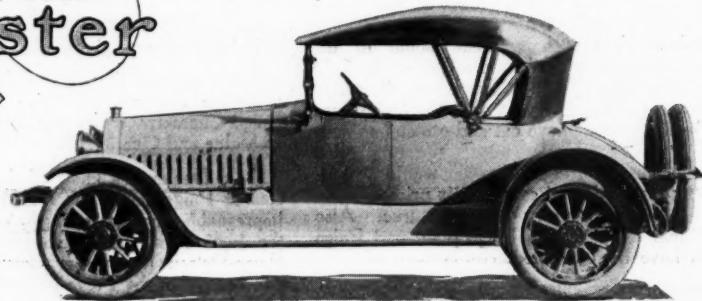


THE PAIGE LIGHT "SIX-36"

THE EASIEST RIDING CAR IN THE WORLD

# Marmon "Forty One"

*The*  
**"CLUB"**  
 Roadster

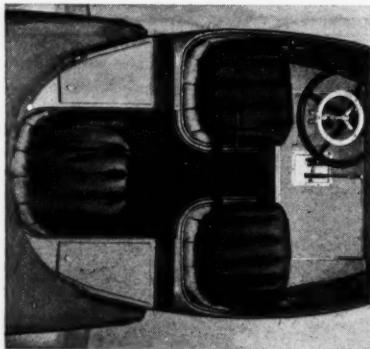


Pleasing lines, harmony of design, appointment and finish, bring to the new Marmon Three Passenger "Club" Roadster an undoubted air of exclusiveness. It is full worthy to be classed with the proved supremacy of the Marmon "41" chassis.

It is different, extremely comfortable, lays well to the road, tracks true, responds to the driver's touch with ease and grace—a wonder-

ful road car—a car for long journeys as well as town use. You will surely want to see it or know the complete details.

The new series Marmon "Forty One" includes the "Club" Roadster, Speedster, Four, Five and Seven Passenger Touring Bodies. Detailed information and "Proof by Performance," awaits you at any Marmon Salesroom or will be mailed you on request.



Showing Seating Arrangement for  
 Three Passengers

**Nordyke & Marmon Company**

Indianapolis (Established 1851) Indiana

**OVER SIXTY YEARS OF SUCCESSFUL MANUFACTURING**

# Step on the Accelerator— Feel Her Pull Away!

When you're rolling along nice and easy in high and suddenly want to shoot around something—when you step on the Accelerator and the old boy loaf—**that's** conclusive proof that you certainly need the New Stromberg Carburetor.

Pep? Listen!—just step on the Accelerator and feel that car of yours pull away! Life—snap—power—speed!—**those** are the New Stromberg exclusive features that have won World's Records.

Thousands of car owners are equipping their new and old cars with the wonderful New Stromberg. Let us show you what we've shown them—that the New Stromberg Carburetor will increase wonderfully your power, acceleration, speed—cut down your gas bills whether your car is new or old. One ride with a New Stromberg and that Carburetor is yours.

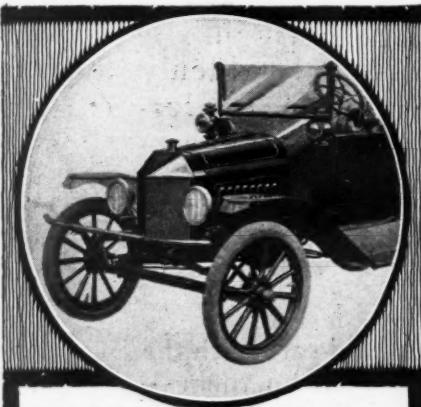


Write  
today for  
new facts with  
details of how we  
prove New Stromberg superi-  
ority. Be sure to state name,  
year and model of your car.

Stromberg Motor Devices Co., 64 E. 25th St., Chicago

**New STROMBERG Does it!  
CARBURETOR**

## LIVINGSTON PRODUCTS FOR FORD CARS



### FORD OWNERS

Increase Efficiency - Improve Appearance  
with  
**LIVINGSTON**

Honeycomb *and* Sloping Hood

In the mountains and hills—  
In the sands and scorching heat of  
the desert—  
In slow-moving, congested city  
traffic—  
In fact, anywhere—

### Livingston Radiators Keep Ford Motors Cool

They are sold under a guarantee to  
give this kind of service.

A Livingston Sloping Hood will give  
your Ford car that long streamline  
effect so admired in cars of higher cost.

Insist upon the name Livingston  
There is no "Just-as-Good"

Pointed Front Radiator.....	\$40.00
Straight Front Radiator.....	35.00
German Silver Finish, extra.....	5.00
Streamline Hood.....	8.00

(For all models from 1912 to date.)

Ask your Ford dealer, hardware dealer,  
or supply house, or write us for full de-  
tails.

Livingston Radiator & Mfg. Co.  
302 West 75th Street New York City

Saturday Eve. Post.....	2,093,395
Literary Digest.....	346,417
Farm & Ranch.....	90,000
Nebraska Farmer.....	51,139
Iowa Homestead.....	140,000

Circulation.....	2,720,951
Readers, about.....	13,604,755

## Dealers' Bulletin No. 2

How do you compute your profits?

Do you figure your profits on the year's business?

Do you buy the cheapest goods, regardless of name, quality and reputation?

Does the merchandise sell rapidly and are your customers satisfied?

How much does it cost to sell any particular accessory?

Mr. Dealer, ask yourself these questions.

Profits are made in turnovers, not leftovers.

You are the great server from manufacturer to consumer, and your business success depends upon satisfied customers. In buying cheap, slow-moving merchandise, your so-called large discounts are eaten up by interest before it moves.

Livingston radiators and streamline hoods are guaranteed to give satisfaction to both you and your customer. Livingston goods attract customers to your store because they are the only Ford type of radiators and streamline hoods that are advertised to the consumer through the big national publications.

The demand for pointed front radiators and streamline hoods for Ford cars is steadily increasing. Your customers will ask for them. The Livingston Company originated this type of radiator and hood. They have always led in quality and sales and they always will.

The "ad" shown at the left of this page will be read by over 13,000,000 people this month—**BUT THIS IS ONLY PART OF THE MERCHANDISING HELP THAT YOU GET WHEN YOU HANDLE THE LIVINGSTON LINE.**

Write us today and get details of the complete selling plan.

## Livingston Radiator & Mfg. Co.

302 W. 75th Street, New York, N. Y.

*All types of Radiators built and repaired*

**BUILT UP TO A STANDARD NOT DOWN TO A PRICE**

# It isn't a genuine FOSTER OWL LIGHT

## unless it has this Foster Universal Swivel

The Owl is the only light that can use the patented FOSTER Universal Swivel. There isn't another light made with a swivel anything like it.

By means of the FOSTER Swivel it is possible to turn an Owl Light in any one of a thousand different directions—and the light will **Stay Put**, unaffected by jar or vibration. Your hand is the only thing that will cause an Owl Light to turn. And the Owl is the quickest, easiest operated light obtainable.

Be sure that you get a FOSTER Owl Light when you ask for it. You can identify the Owl by the Swivel. Avoid infringements and cheap substitutes. The Owl will outlast your car. Its construction is **QUALITY** throughout—and **GUARANTEED**. Brighter than the strongest headlights.

Easiest to operate—always at your fingers' tips. Light quickly switched on or off. Operates from your storage batteries or from dry cells.

**Dealers:** Here is the biggest accessory success of the year. One dealer sold 150 in two months. Liberal proposition. Write.



Picks out bad spots in the road—  
railway crossings—pedestrians. Carries a half-mile ahead. Does not throw an uncontrollable glare like headlights.

The silver reflector is generously large—the bulb a special FOSTER nitrogen Tungsten—50% more powerful and durable than ordinary bulbs and it uses less current.

Attaches to windshield or body of car. Can be installed in a few minutes by anyone.

Complete—with bracket, 3-ft. cord and 2 sockets, ready to put right on. Order direct, or through your dealer. Handsomely finished in black enamel with nickel trimmings. In ordering, state make and model of car, also battery voltage.

**\$9 Complete**



**C. H. FOSTER**

Manufacturer & Distributor of Motor Car  
Accessories

2303 Michigan Blvd., Chicago, Ill.

*Send for Free Catalog of Complete Line  
of Accessories*

# THE STANDARDIZED FOUR OF 1916

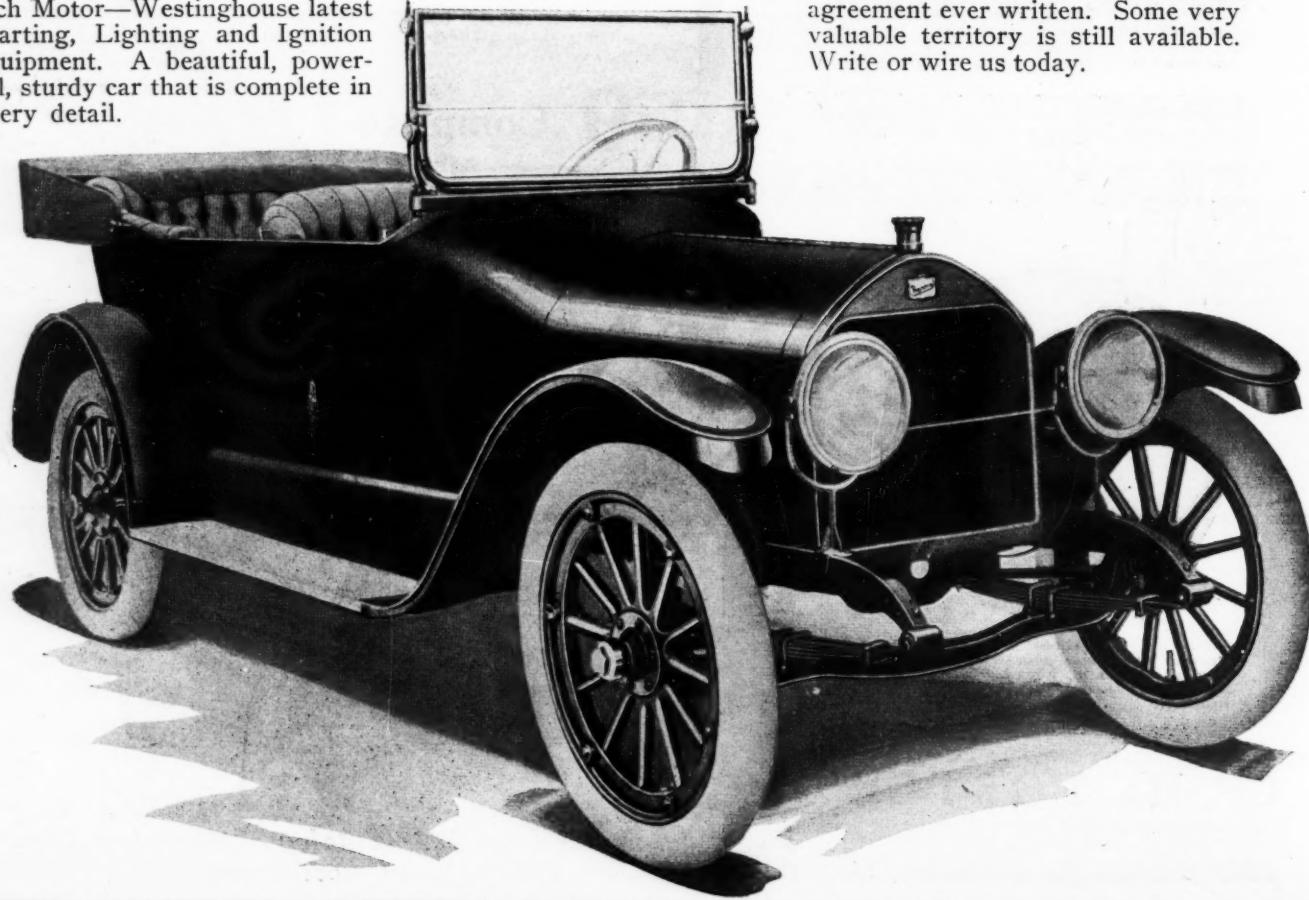
*Imperial*

*With a 115-inch Wheel-  
base and Fully Equipped*

**\$995**

Driven by a Continental 3 $\frac{3}{4}$  x 5-inch Motor—Westinghouse latest Starting, Lighting and Ignition equipment. A beautiful, powerful, sturdy car that is complete in every detail.

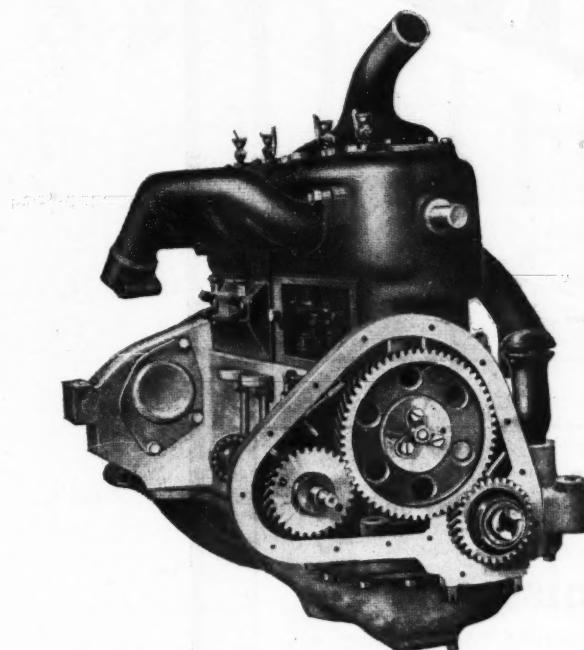
**Dealers**—We offer the fairest sales agreement ever written. Some very valuable territory is still available. Write or wire us today.



# No Wonder This Is a Sensational 1916 Car

Continental Four-Cylinder Motor, 3 3-4x5-inch in unit with Muncie Transmission; Salisbury floating Axles with Brown-Lipe Beveled Differential; Fedder's Hexagonal

Honeycomb Radiator; Hydraulic Pressed Steel Frame; Alloy Steel Springs; Westinghouse Starter geared to Fly Wheel through Bendix Drive; Westinghouse Generator and Ignition; Lavigne Steering, all recognized as the leading unit makers of the world.

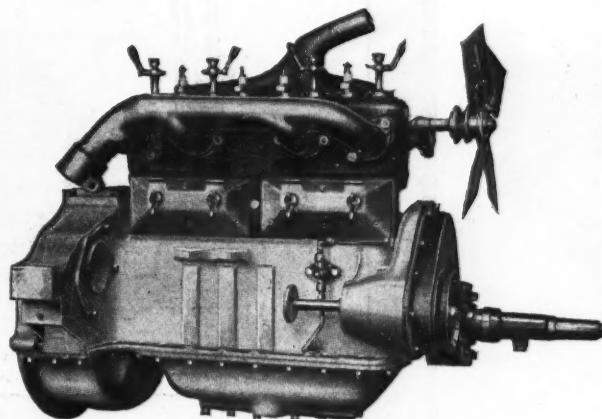


Spiral Gears Used in Continental Four-Cylinder Motor in 1916 Imperial

Is there any wonder that this is a sensational car?

*IT will prove a money-maker for YOU*

The Heart of this Wonderful 1916 Imperial is a High Powered, High Speed, Economical, Flexible Continental Motor



Continental 3 3/4 x 5 Four-Cylinder Motor Used in Imperial Fours

Imperial  
Department

**Mutual Motors Company**

Jackson, Mich.,  
U. S. A.



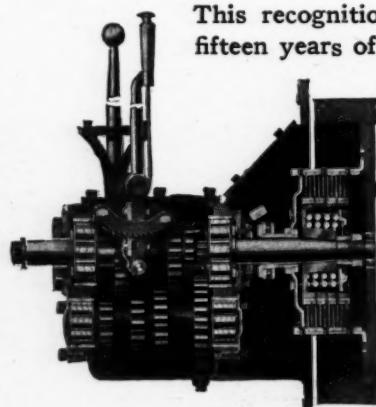
**Right** {  
Design  
Material  
Workmanship

have made their impression on automobile designers and engineers with the result that

### Covert Transmissions

are specified for pleasure cars and motor trucks by noted men of the automobile industry.

This recognition of true merit is the result of fifteen years of specializing in the production of trouble-free transmission units. COVERT transmissions are made in a full line of types and sizes and our engineers will gladly show how easily our product is adapted to your particular needs.



The New Covert Unit Power Plant  
Transmission

**Covert Motor Vehicle Co.**  
FACTORY  
**LOCKPORT, N. Y.**

SALES OFFICE: DETROIT, MICH.

# THE Allen 1916 "37" \$795.

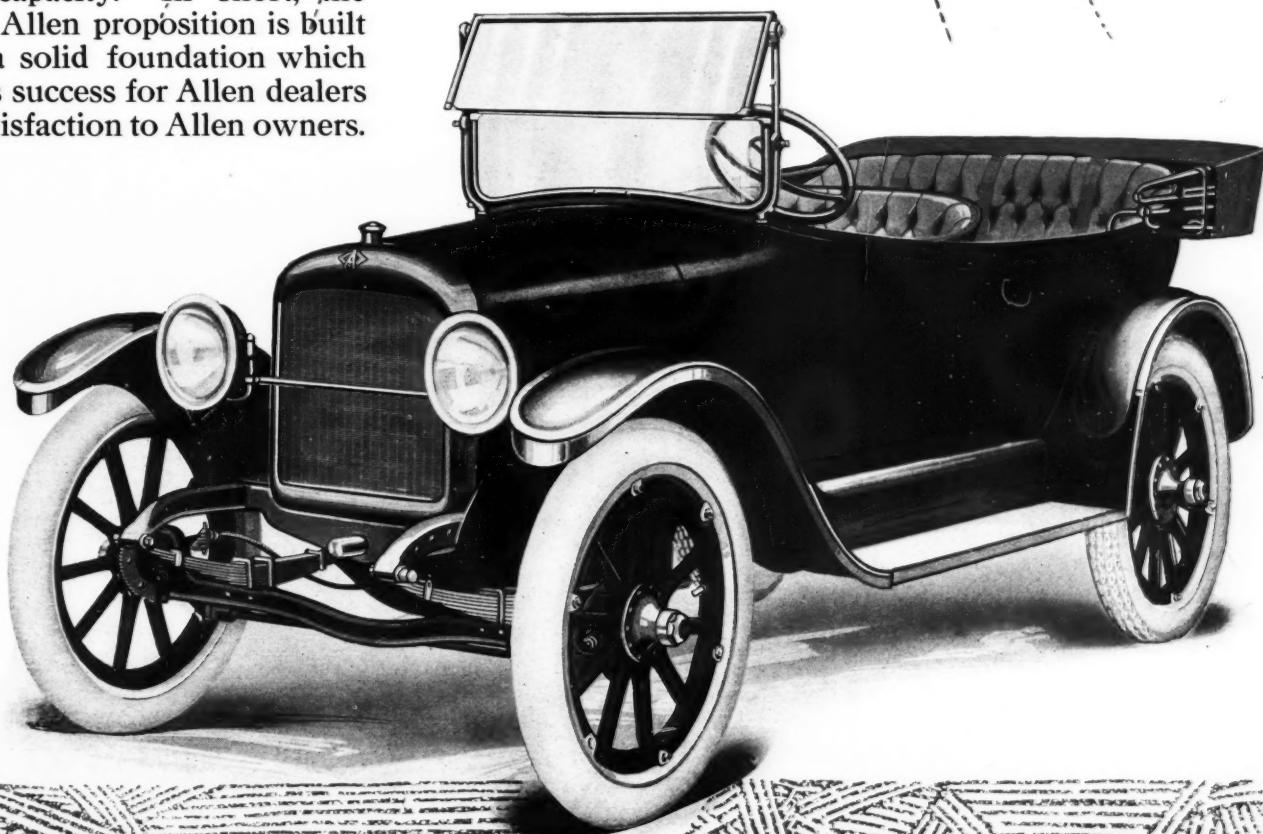
In announcing the new Allen Models for 1916 we have firm confidence that exceptional merit and genuine value will speak for themselves.

After comparing the design and specifications of this car with others in the same price-field, anyone at all familiar with the latest automobile information, will quickly recognize that the new Allen is mechanically and commercially right in every respect. It possesses great selling qualities and is a certain winner. Allen cars have always been favorably known wherever sold.

They are built by a steady, reliable company, strongly financed and permanently established.

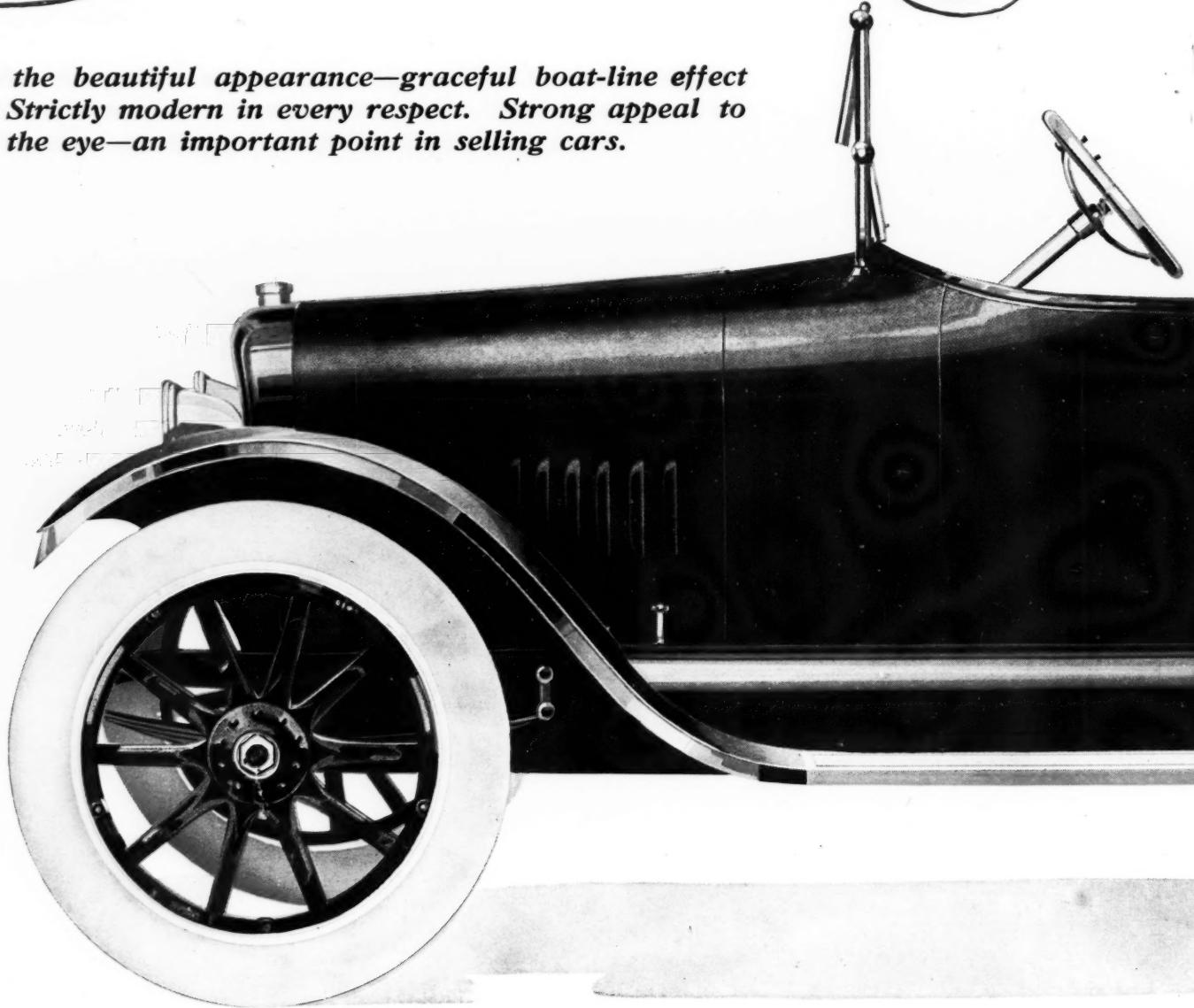
In this new car is concentrated all the best ideas and skill of experienced engineers who are considered among the best in the country.

The production of Allen cars is backed by well organized and finely equipped factories of large capacity. In short, the whole Allen proposition is built upon a solid foundation which insures success for Allen dealers and satisfaction to Allen owners.



# The Allen 19

*Note the beautiful appearance—graceful boat-line effect  
Strictly modern in every respect. Strong appeal to  
the eye—an important point in selling cars.*



## *A Better Car with More*

Full five-passenger body—ample leg room,  
wide seats, wide doors, deep upholstering.

Unit power plant

Lynite aluminum housings

All moving parts enclosed

Long stroke Allen-Sommer motor

Full 37 H. P.—3 $\frac{3}{4}$ -inch bore x 5-inch stroke

Special Stromberg Carburetor

Westinghouse Electric System for starting,  
lighting and ignition

Electric light on instrument board

Electric headlights with dimmers

Electric signal, with button at top of steering  
column

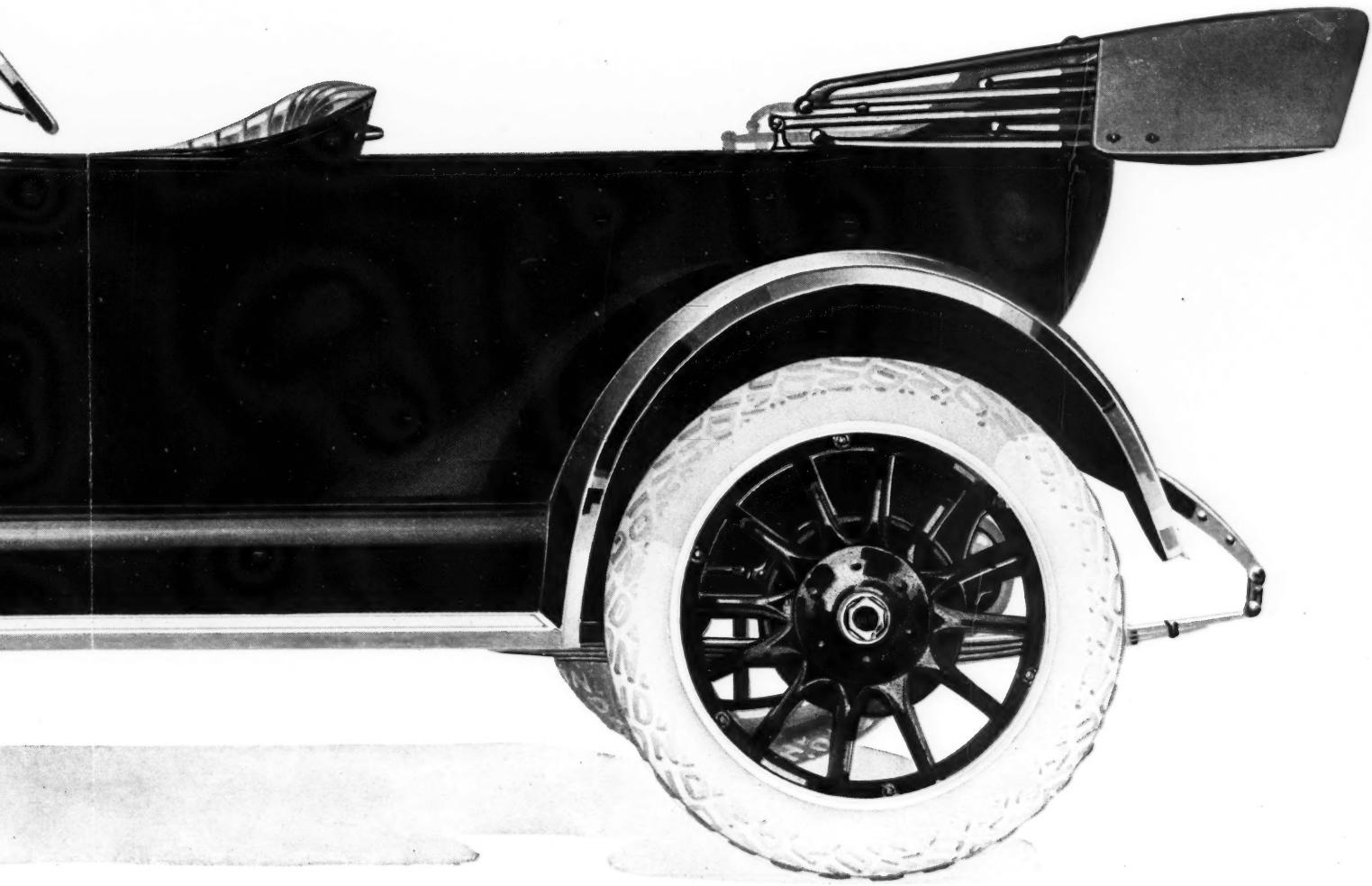
Full floating rear axle—pressed steel housing

## *A Larger Car with More*

# Write The Allen Motor Company

# 916 Model "37" \$795.

*Also a Roadster Model of handsome design—same price—\$795*



## *More Power for Less Money*

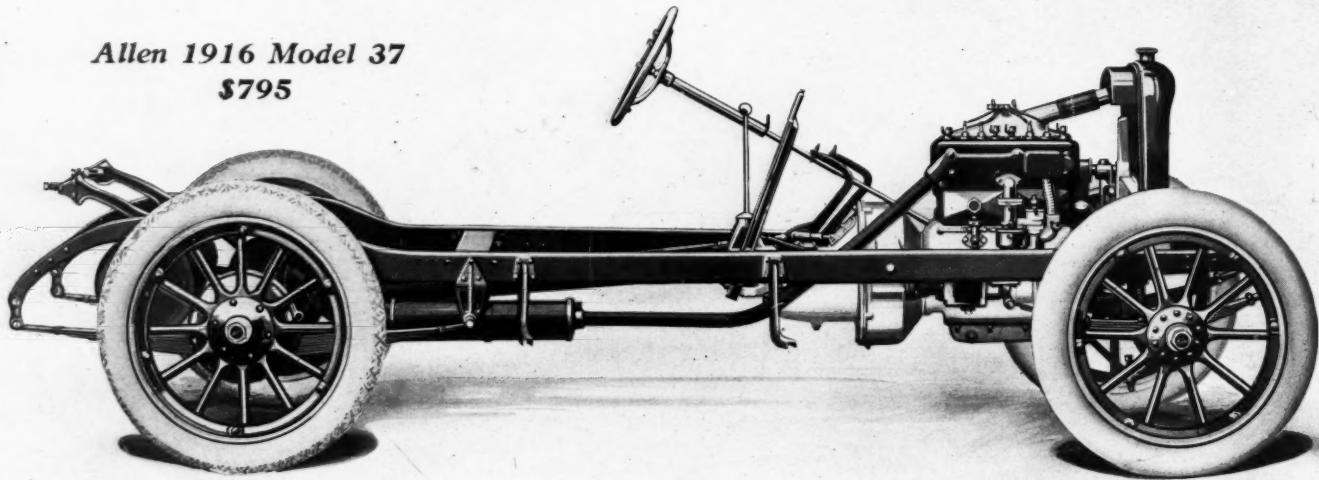
12-inch brakes with pressure equalizers  
55-inch long underslung rear springs, smooth riding and joltless  
"Built-in" Windshield—rain-vision and ventilating  
112-inch wheel base—32-inch wheels  
Firestone demountable rims—(one extra)

Non-Skid tires on rear  
One-man top with top cover  
Light weight, 2300 lbs. complete  
Stewart-Warner Vacuum Fuel Feed System with tank hung at rear  
Crowned fenders and rounded radiator  
Speedometer with Odometer and Trip Adjustment

*More Room but Less Weight*

**Any, Fostoria, Ohio, for further details**

*Allen 1916 Model 37*  
**\$795**

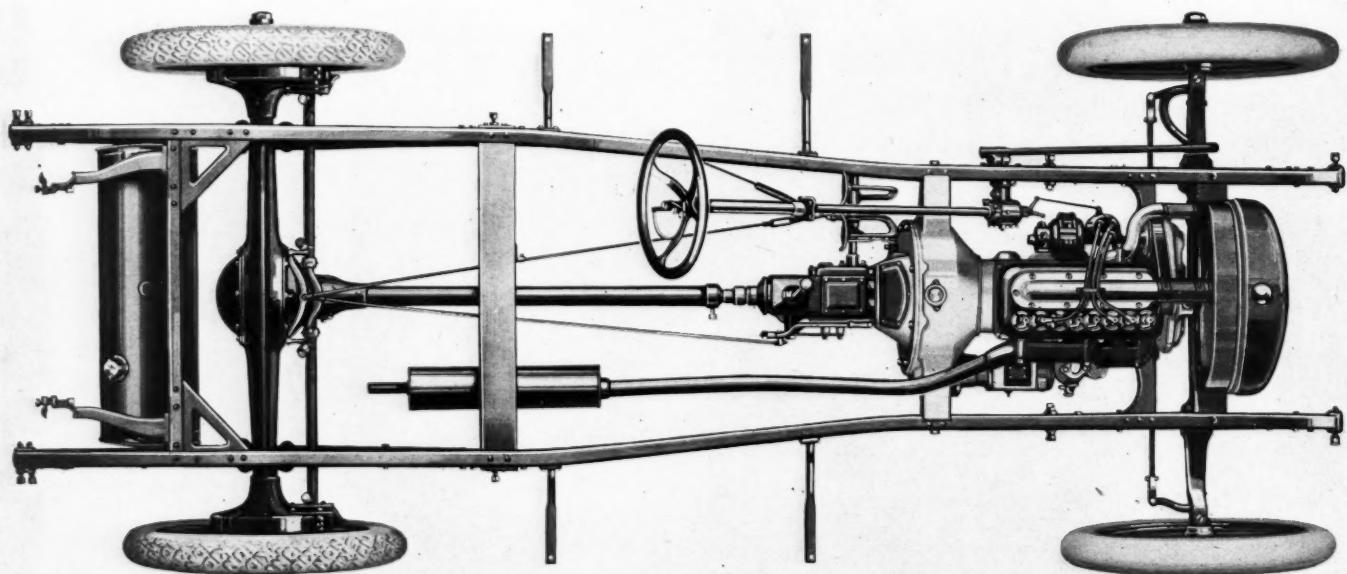


This Announcement is free from extravagant statements. There has been no attempt to gain favor or inquiry by alluring phrases. We believe that alert dealers know automobile value when they see it. We believe the time is past when name or claim is the basis for selection. We only ask that you study the illustrations and read carefully the specifications.

When you have done this, keeping in mind the price, \$795, we are satisfied that you will immediately recognize the exceptional merit of this new Allen model and we shall have all the responses to this announcement that we can take care of with our present open territory.

We suggest wire or special delivery communication to those who are interested in obtaining an agency that will mean a permanent, profitable and satisfactory connection.

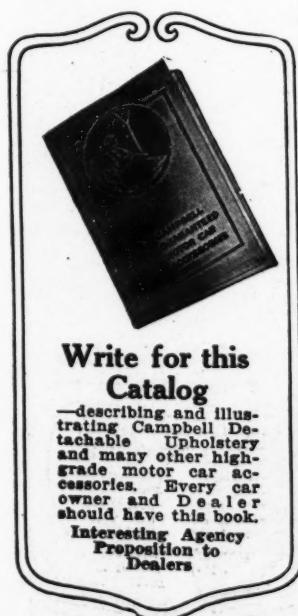
**THE ALLEN MOTOR COMPANY, FOSTORIA, OHIO**





*The Luxurious Scripps-Booth is made even more attractive by Campbell Detachable Upholstery.*

# Adding luxury to luxury!



## Write for this Catalog

—describing and illustrating Campbell Detachable Upholstery and many other high-grade motor car accessories. Every car owner and Dealer should have this book. Interesting Agency Proposition to Dealers.

Owners of thousands of cars that are trimmed in finest hand-buffed leather, equip with Campbell Detachable Upholstery.

Not because they are ashamed of the leather. Not because the cars are old—(most Campbell Detachable Upholstery goes on new cars)—

But because Campbell Detachable Upholstery adds a touch of richness and comfort, a sense of luxury that no other single accessory can give. If there is such a thing as "painting the lily" Campbell Detachable Upholstery does it.

Owners of old cars, too, find that Campbell Detachable Upholstery for it.



gives new attraction and adds luxury to their cars.

No matter what make or model of car you own or contemplate buying, even the latest models, you should equip with Campbell Detachable Upholstery. The cost is surprisingly low; the results remarkable. It goes on over your regular upholstery and is held in place by special simple snap fastenings so that it can be instantly removed for cleaning. Many colors and fabrics to choose from. THE PERKINS CAMPBELL COMPANY, 624 Broadway, Cincinnati, Ohio. New York Office, 89 Chambers street.

## Write for Samples and Prices

# CAMPBELL GUARANTEED MOTOR CAR ACCESSORIES

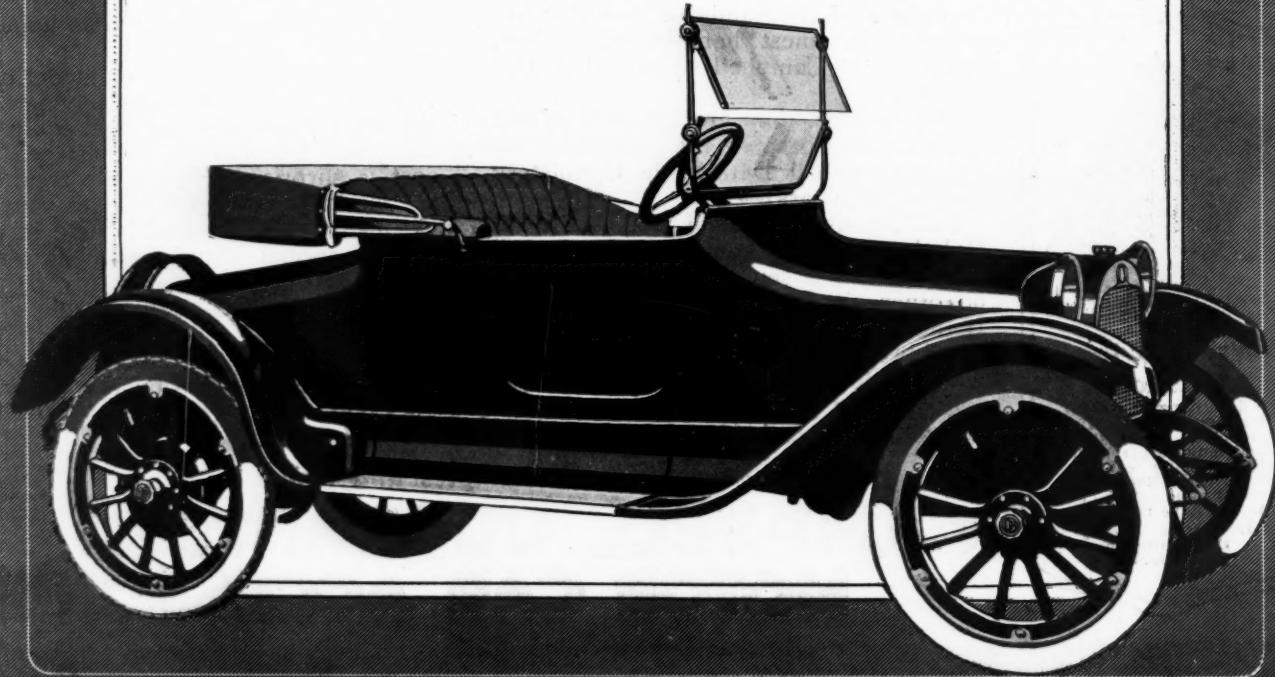
# DODGE BROTHERS MOTOR CAR

**A speed of thirty miles is attained so quickly and so quietly that you are apt to think, until you look at the speedometer, that you have not passed the twenty-mile mark**

It is this characteristic in the car, more than any other perhaps, which has created the widest comment. But the opposite quality—the ability to creep along on high behind a slow moving wagon—awakens almost equal enthusiasm.

The wheelbase is 110 inches  
The price of the roadster or touring car complete is \$785 (f. o. b. Detroit)  
Canadian price, \$1100 (add freight from Detroit)

**DODGE BROTHERS, DETROIT**



ANNOUNCING

Red Head

Trade Mark Reg.

U.S. Pat. Off.



Spark Plugs On The 1916

Mitchell  
8

WE had the Motorists of America  
thinking Red Head; then talking Red Head,  
and finally buying and using Red Head

Spark Plugs

Emil Grossman M'f'g Co. Inc.

BUSH TERMINAL, MODEL FACTORY No. 20  
BROOKLYN (New York City), U. S. A.



## Don't Guess!

Avoid starting, lighting and ignition troubles by being prepared for them.

Keep on more intimate terms with your storage battery and dry cells and your trials and tribulations will be few.

Use the

INDESTRUCTIBLE  
**MONARCH**  
Ammeter & Storage Battery Tester

Unbreakable  
Absolutely Accurate  
Guaranteed for 5 Years

MONARCH AMMETER  
for dry cells.....\$1.00  
MONARCH STORAGE  
BATTERY TESTER..\$1.50

For sale by supply  
houses, hardware  
stores, service  
stations, garages, etc.,  
or sent direct postpaid  
upon receipt of price.

Hercules Instrument  
Company, Inc.

Dept. MA Mt. Vernon, N. Y.

DEALERS: Suggest sales. Get a  
Monarch Display Board with extra  
ammeter attached free with your in-  
itial order for a dozen ammeters.

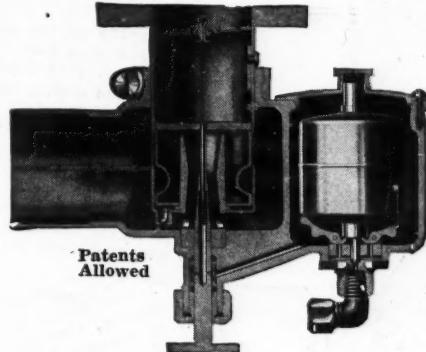


5

## Extra Horse Power

Every Ford owner can add 5 Horse Power to the actual working efficiency of his motor. We guarantee it and prove it on your car at our risk. It costs you nothing to prove our claim. Replace your carburetor with a *Brad-Kent* and see how much more easily you can drive up steep hills or through deep roads. Note how much more quickly you can get away from a standstill.

## New Ford Model



## Brad-Kent

## Carburetor

The *Brad-Kent* carburetor is constructed upon a new scientific principle. It is the only efficient carburetor with but a single adjustment. Mixture is always the same, regardless of speed. Works as smoothly at 4 miles per hour as at 35 miles.

Lighter, simpler and more easily handled than other

types. Easiest to start in cold weather. No water jacket to freeze. Gas and air both regulated by speed of the motor. Cylinders fill better and the perfect mixture will not deposit carbon. The price for the complete Ford outfit is \$15.00—money back if not satisfied in 30 days. Try it on your own car. Make us prove our startling claims.

## 10 Miles Extra Speed

Put a *Brad-Kent* on your car today. And tomorrow you can drive 10 miles faster—on less gasoline con-

sumption. We guarantee to beat other carburetors by at least 10 miles. Make us prove it.

## Saves 2 Gallons Out of 5

The *Brad-Kent* will carry you 32 miles on the same amount of gasoline you now require for 20 miles. We have proved this many times. We are so sure of this that we guarantee to drive your car as far and as fast on 3 gallons of gasoline as you can now travel on 5 gallons. In a recent official test conducted by F. E. Edwards, Official Observer for the Chicago Automobile Club, a Model "T" Ford was driven at

an average of 33.12 miles per gallon. This record was made in a run of 102.1 miles between Chicago and Milwaukee. You want this extra horse-power. You will enjoy this extra flexibility and speed. You need this marked saving in gasoline consumption. And we positively guarantee to you all these things. Our responsibility is well known. Make us show you.

**30 DAYS' FREE TRIAL** Mail the attached coupon with Check or Money Order for \$15.00. We will promptly send you a *Brad-Kent* Carburetor, manifold, hot air tube and stove. Install it on your Ford. It can be done in a few minutes without special tools. Then try it for 30 days at our risk. If you are not satisfied in every way just send the outfit back to us and we will promptly refund your \$15.00 in full. No questions asked. Your money back, regardless of the reason why. You are the sole judge.

**DEALERS**—Be sure to write for our attractive dealer proposition. Try one of our carburetors and see how much better it is. We will help you to sell them in your neighborhood. Write today.



**The Frost Mfg. Co.**  
690 Fremont Avenue  
Kenosha, Wisconsin

When Writing to Advertisers, Please Mention Motor Age

**MAIL IT**  
**30-Day Approval Blank**  
The Frost Mfg. Co., 690 Fremont Ave., Kenosha, Wisconsin  
Enclosed find personal Check or Money Order for \$15.00, for  
please ship personal Check or Money Order for \$15.00, for  
plete outfit for a Ford car. My repair dealer is  
within these 30 days that I may re-  
turn these goods to you  
within 30 days, if I may  
money back, and if I  
wield to do so.  
(3)

Ship to  
Address  
I understand that I may re-  
turn these goods to you  
within 30 days, if I may  
money back, and if I  
wield to do so.  
(3)

*Read what they say*

Of course—how can they say otherwise! No man who has ever enjoyed the satisfaction of indestructible wire wheels and their almost instantaneous interchangeability would go back to the primitive wooden wheel with the demountable rim all trimmed up with locking nuts.

Did you ever see a man in your life who could tighten up the eight bolts on a demountable rim quickly and give them an even tension?

## HOUK DETACHABLE WIRE WHEELS

are absolutely round. That's one of the reasons why they give you such a large tire saving. Demountable rims with the wedges unevenly tightened produce distorted wheels.

The roundness, the trueness, the strength of the HOUK WIRE WHEEL, together with its trim mechanical appearance and the mental satisfaction of having eliminated the danger, make them a highly desirable asset for any motorist regardless of the fact that they are such big tire savers. They eliminate accidents due to wheel breakage and they make it possible to quickly and comfortably change a tire in a few moments.

You need them. Ask your dealer or ask us.

**Houk Manufacturing Company**  
1701 Elmwood Ave., Buffalo, N. Y.

"About a year ago I secured from you one of the first sets of HOUK DETACHABLE WHEELS which you put on the market. These wheels were fitted to a Packard special roadster which we were rebuilding for speed work on the road. Since then this car has been driven all over North Carolina, always at high speed. Over the rough roads which we have in January, I drove from Winston-Salem to Charlotte, a distance of 86 miles, in 2 hours and 45 minutes."

"I had heard beforehand all of the good qualities and claims made in behalf of the wire wheels, some of which I wished to have proven to me. I can now say that every claim that was made to me at that time, viz: ease of riding, strength, wear on tires, quickness of change, has been fulfilled to the highest degree."

"In spite of the use, misuse and abuse which these wheels have been subject to for more than a year, I do not find that there is a single spoke loose, and the enamel has not been chipped. The locking device is ideal and works even better than when we first got the wheels."

"I consider the above facts all the more remarkable when you take into consideration what a severe side strain these wheels have been subjected to in rounding unbanked turns, especially where the roads are rough and rocky."

"I have had absolutely no trouble whatever with these wheels, they having been installed since January, 1914, on these cars. I find that the car rides considerably easier, there being less shock and vibration, and also find the tires remain very much cooler than with wooden wheels. They undoubtedly save the car from a great many road shocks and undoubtedly will lengthen the life of the chassis. I do not hesitate at all to recommend them. I further beg to state that should I purchase another car it surely will be equipped with wire wheels."



# You Can Sometimes Tell by the Smell

Most motorists consider buying tubes largely a matter of speculation for the reason that it is almost impossible to tell a good tube from a poor one, when both are new and fresh.

A cheap "reclaimed rubber" tube (which may contain less than 15% real rubber) when new and fresh from the factory will closely resemble, in almost every particular, a high grade tube made entirely of pure rubber. Even the elasticity and toughness seem equal.

But the difference becomes apparent when the tubes are in use, for then the cheap tube grows hard and stiff, rapidly deteriorates, loses its resilience, becomes porous and is easily affected by heat. It will neither last nor wear one-third as long.

## Tell by the Smell

But there is a way you can sometimes distinguish a good tube and that is by its smell. Pure Para Gum has a distinctive aroma. It smells exactly like old-fashioned Virginia Smoked Ham. And even after Para rubber has been washed and loft dried for months and cured, this smoked ham fragrance clings to it. You can easily detect it in a National Special Red Tube the instant you open the carton. You can detect it in any tube made of Up-River Fine Para.

Tubes not made of fine Para either have no odor at all or else they have a musty, somewhat disagreeable, smell.

## Built by Hand—Extra Thick

But it is not alone this Selected Up-River Fine Para that makes National Tubes better. Our method of slow-loft drying the gum, our way of building the tube and our special process of curing it play an equally important part.

**More tires are ruined through cheap porous tubes than through any other cause.**



In place of using but one thick sheet of rubber, rolled on a tube and then vulcanized, as in common tube manufacture, many thin sheets are used, and each thin layer is carefully inspected and applied under enormous pressure. We do this because microscopic air holes, pockets and flaws remain undetected in thick sheets of rubber. This is why National Tubes never slow leak.

Then comes our curing process which welds these thin sheets into one solid tube. It is through this process that the rubber in National Tubes obtains its remarkable tensile strength and resilience. Even after a full year's service this tube will still be non-porous and show no sign of deterioration. This we guarantee.

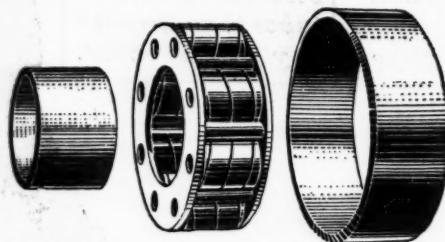
Don't ruin a good tire with a cheap tube. Pay fifty cents more and get 100 per cent tube value. Learn the satisfaction to be derived from the use of good non-porous tubes. Buy National Specials.

*National Rubber Company  
Factories and Main Offices  
Pottstown Pa.*

# *National Special* *Red Tube*

# HYATT

## QUIET ROLLER BEARINGS



### Adjustment Not Necessary

The bearings in the transmission or rear axle of your car are subjected to a lot of severe use. Some bearings wear and get noisy under this work, and to take up this wear they are provided with adjustment.

It is never necessary to adjust Hyatt Roller Bearings—they are made right in the first place, and stay that way.

The hollow spiral rollers of Hyatt Bearings render them self-oiling and self-cleaning, obviating the necessity of adjustment, because they do not wear enough to warrant it.

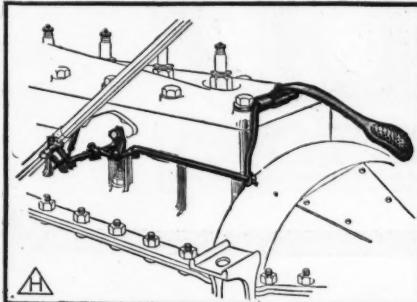
This feature of Hyatt Quiet Bearings renders them "fool proof" in the hands of the most inexperienced user.

*"Hyatt Quiet Bearings"*

HYATT ROLLER BEARING CO.  
DETROIT, CHICAGO  
NEWARK, N.J.



# HUMBOLDT'S NEW IDEAS FOR FORDS



## Use Your Foot

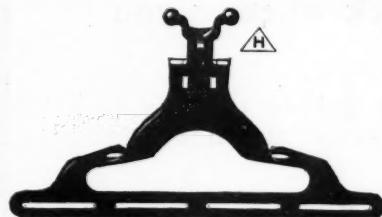
and get that positive and flexible control that is characteristic of the highest priced cars.

Our foot accelerator is the best, neatest and most easily attached accelerator in the world. It can be installed in 20 minutes without

boring holes or otherwise marring the car.

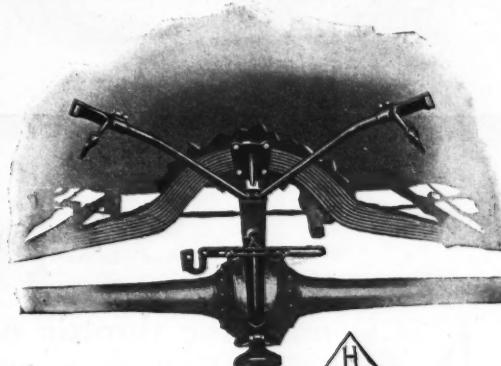
Independent of steering post control. Absolutely the most desirable accessory ever devised for Ford cars. It Costs only \$1

## Humboldt Combination Crank Holder, Lock and License Bracket



PRICE \$0.60

Attaches to front spring clips and has a folding prong which holds the crank vertical and prevents swinging and rattling. An eye loop permits locking the crank with a padlock. The license plate is held rigid and in an out-of-the-way position.



## Rear Tire Holder

The only practical rear end tire holder on the market at the present time is our No. 284.

It holds the tires in rigid position, no chafing possible, and holds them free of the exhaust. Suitable for one or two tires. Made of selected malleable iron and supplied with license pad holder and lamp bracket.

Finished in hard black rubber enamel.

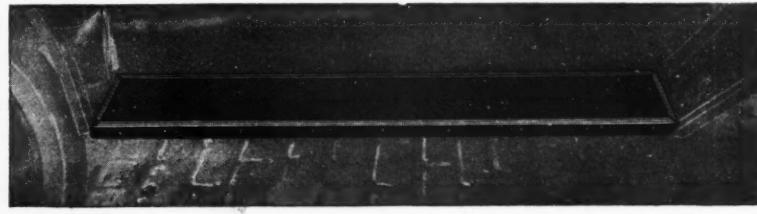
Complete with straps, \$3.90

## THE GREAT DEMAND

for a neat, well-made linoleum running board outfit is supplied by us with this set, which is made of selected hard wood, covered with the best quality standard brown linoleum with corrugated brass mouldings.

Completely assembled, ready to be mounted on touring car or runabout.

Set of two, \$7.50



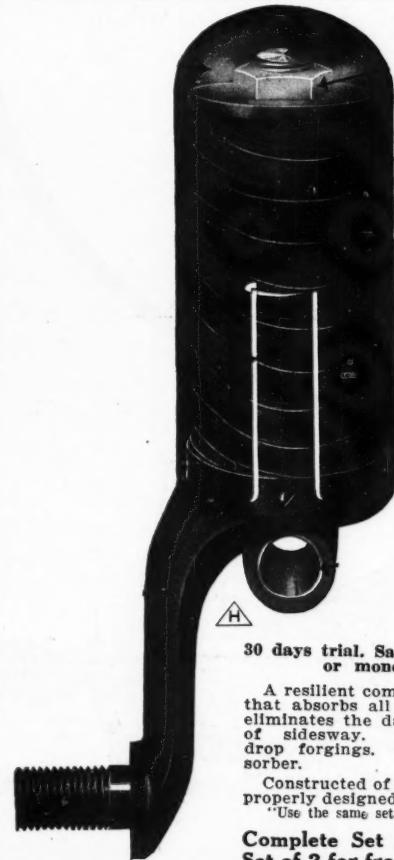
## Ridewell Shock Absorber

30 days trial. Satisfaction guaranteed or money refunded.

A resilient compound spring cushion that absorbs all wheel vibration and eliminates the danger and discomfort of sidesway. Especially designed drop forgings. A better shock absorber.

Constructed of selected material and properly designed. Will outlast the car. Use the same set on succeeding models."

Complete Set of 4.....\$10  
Set of 2 for front or rear, only \$5



## Dealers and Jobbers

who handle our line build up an exclusive trade in accessories for Fords that finds its reflection in their bank balances. Write us about it.

Complete Catalog on Request

**Humboldt Machine & Stamping Co.**  
81 Tenth Street Long Island City, New York

# RAYFIELD

CARBUREATORS

## Step on it!

KICK open the throttle on your Rayfield-equipped car and you are off with a rush from the slowest speed to the fastest you want to go. The response is as quick whether you start from three miles an hour or thirty.

The motor with a Rayfield never loads. The gas gets to the cylinders in a steadily efficient volume—the carburetor action synchronizes with the motor speed.

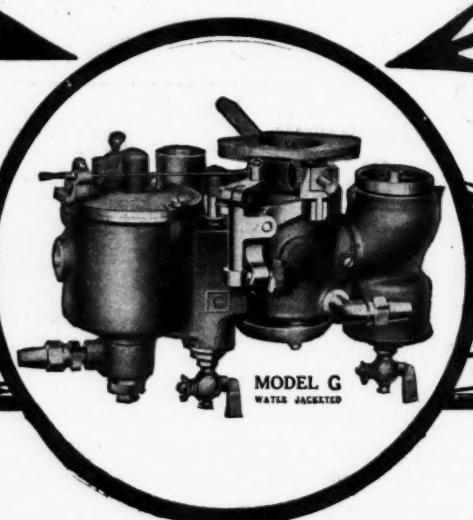
This amazing flexibility has made Rayfield continuously famous and gives it the highest position in the regard of motorists.

In other carburetor qualities the Rayfield is unequalled; but Motordom proclaims it Leader because even at a snail's pace you can "step on" the Rayfield throttle and get away quickly.

Many dealers are finding that, even where it is not specified as regular equipment, manufacturers will put a Rayfield on if they ask for it.

FINDEISEN & KROPP MFG. CO.  
2109 Rockwell Street, Chicago

BRANCHES:  
1140 Michigan Av. Chicago 1902 Broadway New York 1214 Woodward Av. Detroit



## A Starter for Ford Cars

# Genemotor

(Trade Mark)

The Standard by  
which all others  
are judged

**\$75** F. O. B.  
LYNN,  
MASS.

**A. J. PICARD & COMPANY**

Sole Distributors  
1720-1722 Broadway, New York

Built by the **General Electric Company**

# Connecticut Automatic Ignition Increases the Range of High Gear Efficiency



*A test of skill as a driver is to pilot a car successfully through the congested traffic of a big city's streets.*

*A few blocks of this kind of driving calls for more expert handling of the spark and throttle—more cleverness in slipping the clutch or constant use of the brakes, and far more skill in shifting gears than a whole day's touring on country roads.*

Connecticut Automatic Ignition makes a car handle easier under the most adverse conditions because it delivers its hottest spark at slowest speeds. A hot spark—a spark that grows hotter as speed decreases—enables you to creep along on high gear—gives you the power for a quick pick-up and insures unfaltering firing in all cylinders, thus reducing gear shifting to a minimum.

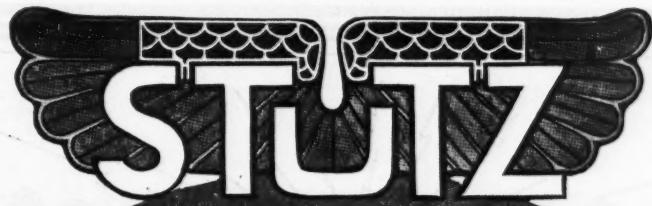
By enabling you to drive much slower on high gear, Connecticut Automatic Ignition opens up a more practical range of speed than any other form of ignition.

As far as high speed is concerned the finest high tension magneto cannot show any better results than Connecticut Automatic Ignition.

**AUTOMATIC IGNITION  
CONNECTICUT**

**CONNECTICUT TELEPHONE & ELECTRIC COMPANY, Inc., Meriden, Conn.**

We announce a Connecticut Automatic Ignition System for Ford Cars. For information and details address  
A. J. Picard & Co., Sole Agents, 1720 Broadway, New York



## CONSISTENCY

Another New Record—Out of 14 Starts at all distances STUTZ finished 13 cars.

### At Indianapolis, May 31st, 1915— 500-Mile Track Race

Three STUTZ cars entered.

Three STUTZ cars qualified averaging 97.35 M.P.H.

Three STUTZ cars finished averaging 84.95 M.P.H.

—a world's record for teams.

The first time in the history of the 500-mile Indianapolis Sweepstakes that a single team of three cars, ALL qualified, ALL finished and ALL placed.

### At Chicago, June 26th, 1915—500-Mile Track Race

Three STUTZ cars entered.

Three STUTZ cars qualified averaging 104.52 M.P.H.

Two STUTZ cars finished averaging 94.49 M.P.H.

### At Tacoma, July 4th, 1915—250-Mile Montimarathon

One STUTZ car entered—finished second.

### At Tacoma, July 5th, 1915—200-Mile Pot Latch Trophy

One STUTZ car entered—finished second.

### At Saginaw, July 4th-5th, 1915—6 Races

One STUTZ car entered—finished first in all six.

STUTZ MOTOR CAR CO., Indianapolis, Ind.



*When Writing to Advertisers, Please Mention Motor Age*



It isn't alone the quality of materials and workmanship that makes for the superiority of the special Eisemann system for Ford cars, for the cleverness of design that makes the system so simple and so easy to install is also of fundamental importance in the excellency of the unit.

In this connection it should be borne in mind that the most inexperienced mechanic or Ford owner can install the Eisemann system with ease and celerity. There is nothing complicated about the work nor are there any changes to be made in the car.

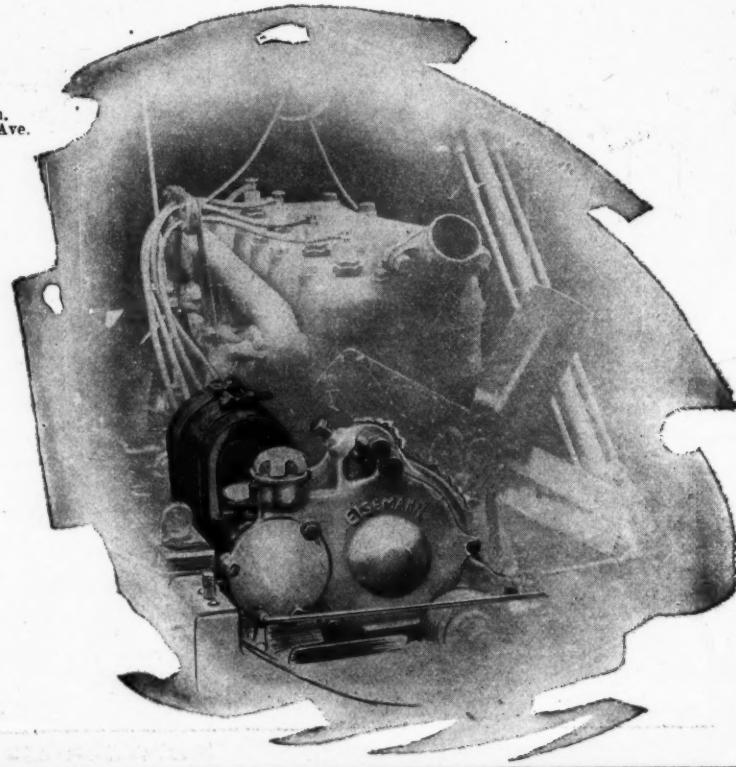
And installed it gives to its user the very finest magneto outfit it is possible to produce for any car regardless of price. It is a quality outfit all the way through.

**Ford System  
Simple and Easy  
to Install**

**The Eisemann Magneto Co.**

Sales and General Offices  
32-33d St., Brooklyn, N. Y.

New York      Indianapolis, Ind.      Detroit, Mich.  
245 W. 55th St.    415-417 N. Capitol Ave.    802 Woodward Ave.



*Announcing  
the 1916*

*Pullman*

**The  
Palace Car  
of the Road**

Our policy has always been not to cheapen our car but to maintain our "standing" as **Builders of Cars of Quality.**

Increased quantity production, made necessary by the tremendous demand for PULLMANS all over the world, has enabled us to supply this season **The Palace Car of the Road** at a price within the reach of all.

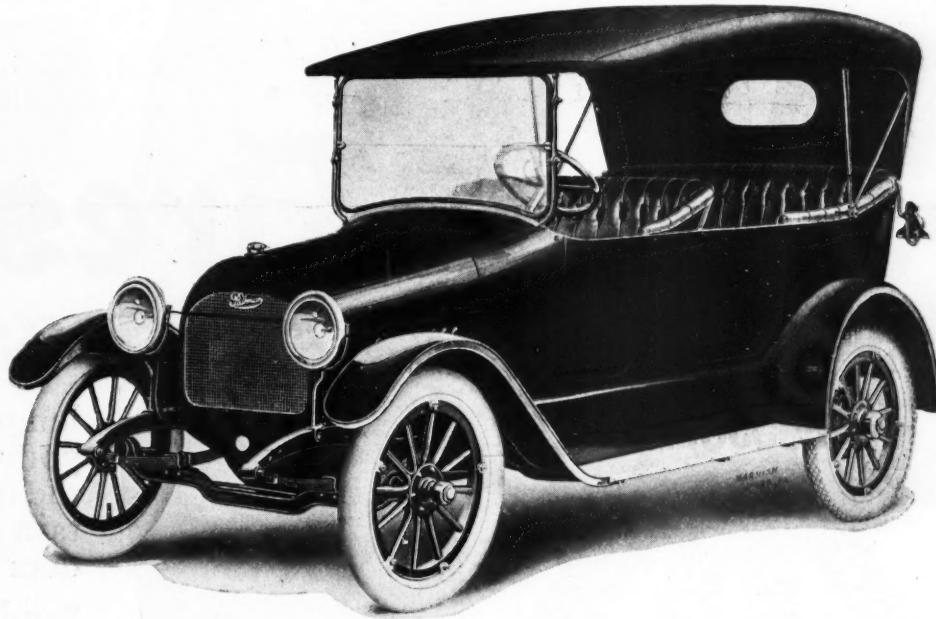
A  
Startling  
Revelation  
of what  
Can Be  
Embodied  
in a  
Motor Car  
For  
**\$740**

F. O. B. York, Pa.

**Specifications in Brief**

Motor, four cylinder,  $3\frac{3}{4} \times 4\frac{1}{4}$ . Wheelbase, 114 inches. Springs, cantilever. Lighting and starting, Apelco system. Ignition, "Dixie" Magneto. Body, PULLMAN standard streamline, trimmed in genuine leather. Tires,  $3\frac{1}{2} \times 4$ , non-skid all around, standard make. Equipment, complete.

Built in Touring—5 pass.  
Roadster—3 pass. clover leaf type.  
2 pass. standard.



The volume of cars to be built in 1916 enables us to consider a few more responsible dealers. Perhaps you are located in some unoccupied territory. Our proposition is very interesting. Write or wire.

**Catalog On Request**

**Pullman Motor Car Company**  
York, Pa., U. S. A.

Export Dept., 100 Broad St., New York, N. Y.

# The Hub of Tire Service



TO get the most mileage out of your tires watch for the little troubles and stop them before they grow big.

There is a Firestone Accessory for every emergency—the full line carries the Firestone manufacturing ideals that have made Firestone Tires supreme.

## Firestone Accessories

lengthen the life of your tires and make the quick getaway certain when a mishap does occur.

Send for catalogue and description of the entire line.

The Firestone Cementless Tube Patch shown here is a good example of the completeness, the detailed efficiency of Firestone accessory service. It is convenient, easy to apply and strong enough to hold under the strain of heavy touring. An exclusive feature is the Firestone TAB which permits instant removal of the protecting muslin. Write for free patch and test it yourself.

**Firestone Tire and Rubber Company**  
*"America's Largest Exclusive Tire and Rim Makers"*  
 Akron, Ohio—Branches and Dealers Everywhere

# J-M AUTOMOBILE ACCESSORIES

One Firm      One Service  
One Guarantee

A three-fold assurance of satisfaction  
that covers the most complete line of  
automobile accessories marketed by a single company.

Quality      Value  
Responsibility

Three advantages which any owner  
enjoys to the utmost when his car is  
equipped with J-M accessories.

JOHNS-  
MANVILLE  
SERVICE

COVERS  
THE CONTINENT

## J-M NON-BURN BRAKE LINING



### The Lining that Makes the Brake Dependable

When you say that the BRAKE brings your car to a stop you mean the BRAKE LINING.

For it's the brake lining that actually does the work, aided, of course, by the brake mechanism.

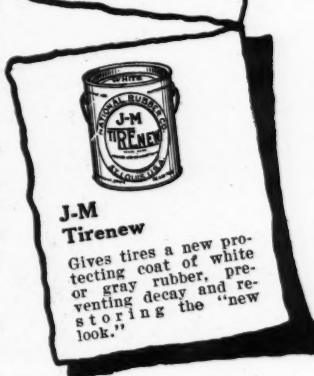
Your brake lining MUST be right, else the safety of the car's occupants is in constant jeopardy.

Your brake lining is right if it is genuine J-M Non-Burn.

J-M Non-Burn can't burn no matter how hot the brake drums become, and its efficiency is not impaired by water, oil or gasoline.

In the industrial field J-M Non-Burn has established a record for efficiency, dependability and durability that gives added proof of its supreme fitness for the motor car field.

Packed in cartons containing cut pieces of correct size for all popular makes of cars. Sold by most good dealers. Write today for booklet.



## JOHNS-MANVILLE SHOCK ABSORBER

Take  
the Thump  
Out of  
the Bump

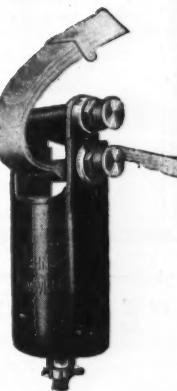
Enjoy greater comfort and at the same time insure your springs against breakage and your car against depreciation by ABSORBING VIBRATION.

Johns - Manville Shock Absorbers do it and do it most effectively. They cushion the stiffest spring. They make easy riding a reality. The improvement they effect in a car's riding qualities is remarkable.

Ride in a car equipped with Johns-Manville Shock Absorbers if you would know the difference they make. Or, better, have YOUR car equipped with them.

Johns-Manville Shock Absorbers fit springs up to 2 1/4 inches wide and are easily attached.

See your dealer today. Write nearest Branch for booklet.



Per Pair \$15

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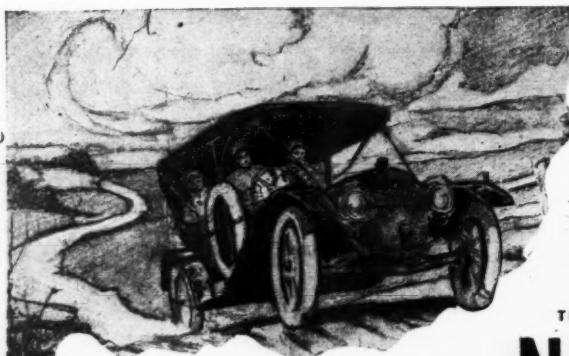
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THE CANADIAN H. W. JOHNS-MANVILLE CO., LIMITED



## Are You Losing 2 H. P. Out of 20?

Transmissions are a source of great frictional loss—the amount depends upon the lubricant you use. Stiff, unyielding grease puts a tremendous overload on the driving shaft. Oils leak off, leaving the gears unlubricated and unprotected. Hence, friction and loss of power result, and the gears soon wear out.

TRADE MARK  
**NON-FLUID OIL**  
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### The ONE Perfect Lubricant for Saving Power Losses

NON-FLUID OIL is soft, yielding, adhesive lubricant. It gives no resistance to the motion of the gears but completely envelops and clings to the teeth at maximum speed. It does not melt or congeal. It stays in the housing. It is durable. It prevents metal-to-metal contact. Gears run quietly, shift easily and do not absorb power. NON-FLUID OIL will increase your power, eliminate wear, and reduce your lubricating expense.

*Get a Can Today and Prove it.*

*Reduced prices for 1915. Ask your dealer. The original NON-FLUID OIL is identified by orange-colored cans bearing the above sprocket-wheel trade mark. Avoid Substitutes.*

**New York & New Jersey Lubricant Co.**  
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"K No. 00 Special"  
 for sliding gear transmission  
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 for differential compression  
 cups, and all bearings

## "Exactly What You Wanted to Know, Told So You Can Understand It"

*A Valuable Book for Owners, Repairmen, Drivers, Students and Salesmen*

**FIVE BOOKS IN ONE COVER**  
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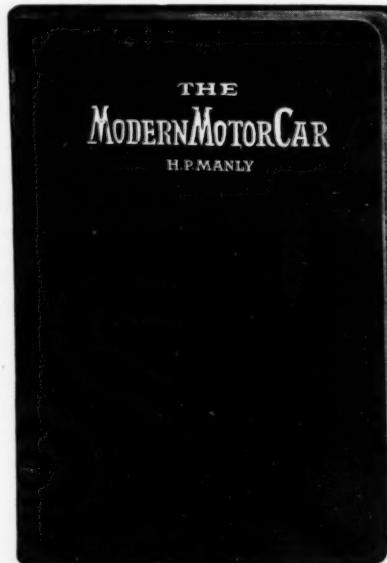
I

**PARTS OF THE CAR**—Their Construction, Use, Care and Repair.

Contains simple rules for performing every mechanical operation the car can ever need. Not only covers the newest developments, such as eight-cylinder engines, vacuum fuel feed, etc., but contemplated improvements from the makers of cars and parts.

II

**MATERIALS AND SUPPLIES**—How to Use, Buy or Make Everything Needed in Running the Car.



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V

**IGNITION PARTS**—Design, Construction, Care and Repair of Every Standard Form of Ignition Appliance as Well as Newest Adaptations.

**INDEX**

24 PAGES—Listing 1165 Headings Under Every Possible Classification.

## "The Modern Motor Car"

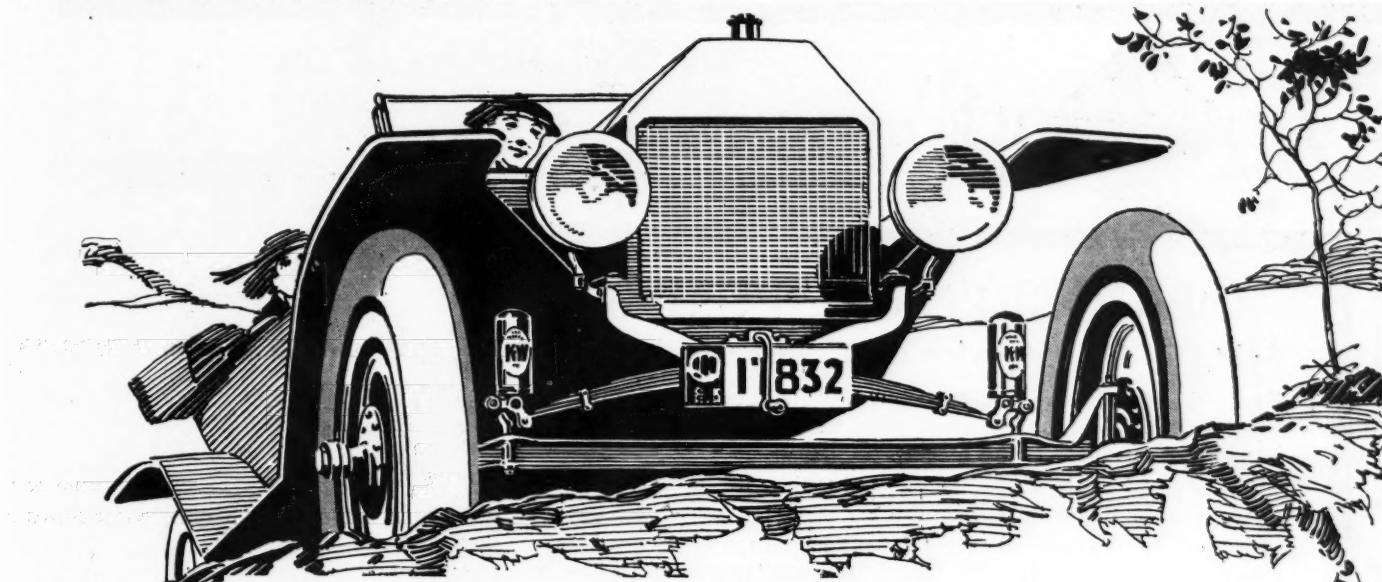
*A complete book on upkeep and repair.  
 Brand new from cover to cover. Contains no history, out-of-date or obsolete matter.*

*A money saver for every man interested in motor cars.  
 Written in non-technical language.*

Bound in Black Morocco with Flexible covers, Gold Lettering and Polished Edges the MODERN MOTOR CAR sells for only \$2.50

THE CLASS JOURNAL COMPANY

900 MICHIGAN AVENUE, CHICAGO, ILLINOIS



## Enjoy the Scenery—Forget the Bumps

**Be a Tourist—Not a mere Road Inspector**

Many motorists today are slaves to the road. Their daily drives and week end trips are limited because of rough, rutty roads. They arrive home tired from being bumped around and "picking the roads"—they see nothing else all day.

Don't be a mere road inspector—equip your light, economical Ford with K-W Road Smoothers and get the greatest enjoyment and comfort.

K-W Road Smoothers give you this enviable comfort because their design combines these three vital factors.

1. A spring to effectively take up the shock.
2. An anti-rebound air chamber to check the rebound.
3. Anti-side motion links to prevent side rocking and swaying.

Each of these features is in itself vital to your comfort and safety. It's only when they are combined in one device that you will get the greatest pleasure from your car. Here's how the K-W Road Smoother fills all these requirements:

### The K-W Spring

A helical spring that effectively takes up the shock, made of electric smelted, chrome vanadium steel. The K-W bracket design allows almost twice the length of spring action or "travel" (in actual service) of any other.

### The K-W Air Chamber

The anti-rebound air chamber with its smooth fitting piston acts like a door check, and gently "eases off" the rebound of the spring. This is an exclusive K-W feature. Its design provides a strong, tough, self-lubricating piston, working in a dust-proof air chamber. It requires no attention.

### The K-W Side Motion Links

Made of the highest grade heat-treated drop forgings of remarkable toughness. This enables them to withstand the great strain put upon them. They prevent your car from pitching, swaying or skidding while making sharp turns.

**\$15 SET OF FOUR  
ONE FOR EACH WHEEL**



### K-W Bushings

All bearings are phosphor bronze throughout. That means long life. K-W Road Smoothers do not interfere with steering.

**But you can find all of these vital factors only in K-W Road Smoothers**

That is why they lengthen the life of your car, by eliminating shock and vibration. Tire economy is assured, because K-W Road Smoothers enable the wheels (not the whole body of the car) to follow the contour of the road. That means no grinding off the rubber of the tires. K-W Road Smoothers always make good because they are built with characteristic K-W Quality throughout.

But after all's been said and done, it's results that count; and the K-W guarantee covers not only workmanship and material, but results as well.

K-W Road Smoothers are quickly and easily attached. No holes to drill and no tools necessary except a wrench. And the final and biggest advantage you get from K-W Road Smoothers is that they increase the radius of your car's usefulness, and bring you home with that "satisfied feeling" after a day of comfortable motoring.

If your dealer can't supply you, send pre-paid upon receipt of price.

**Write for booklet "That Satisfied Feeling"**

**THE K-W IGNITION CO.**  
TRADE MARK  
2835 Chester Ave. CLEVELAND, OHIO. U. S. A.  
Makers of 125,000 K-W Master Vibrators



## "BRIDGEPORT" PUMPS

Built to Give Service, Not Just to be Sold

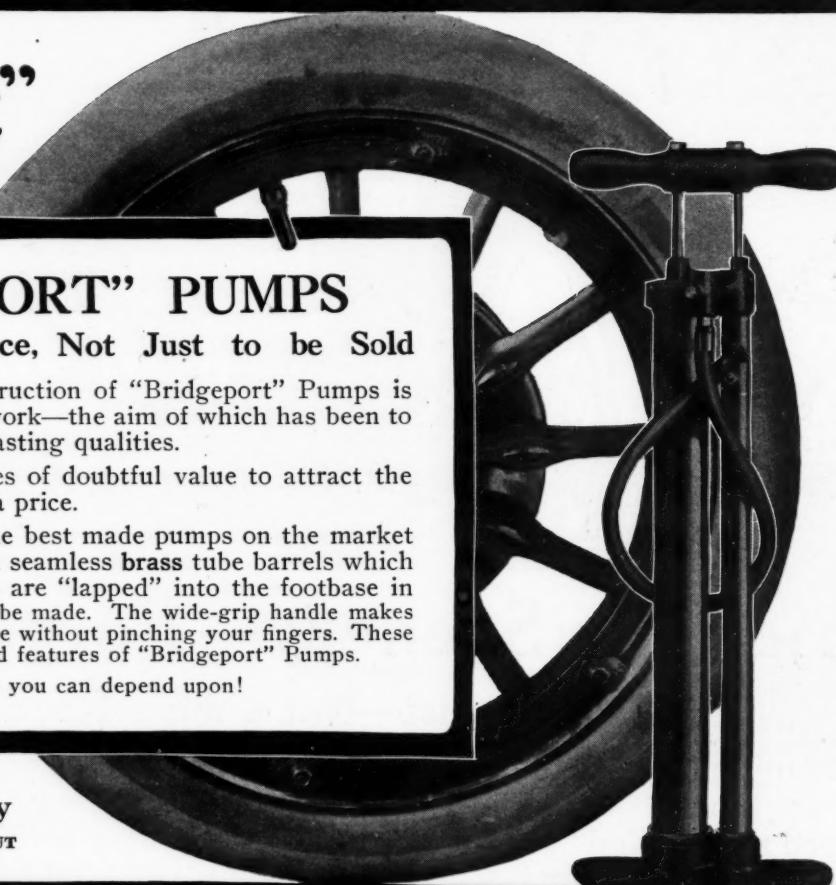
Every feature in the construction of "Bridgeport" Pumps is the result of development work—the aim of which has been to improve their service and lasting qualities.

There are no flashy features of doubtful value to attract the unwary or to substantiate a price.

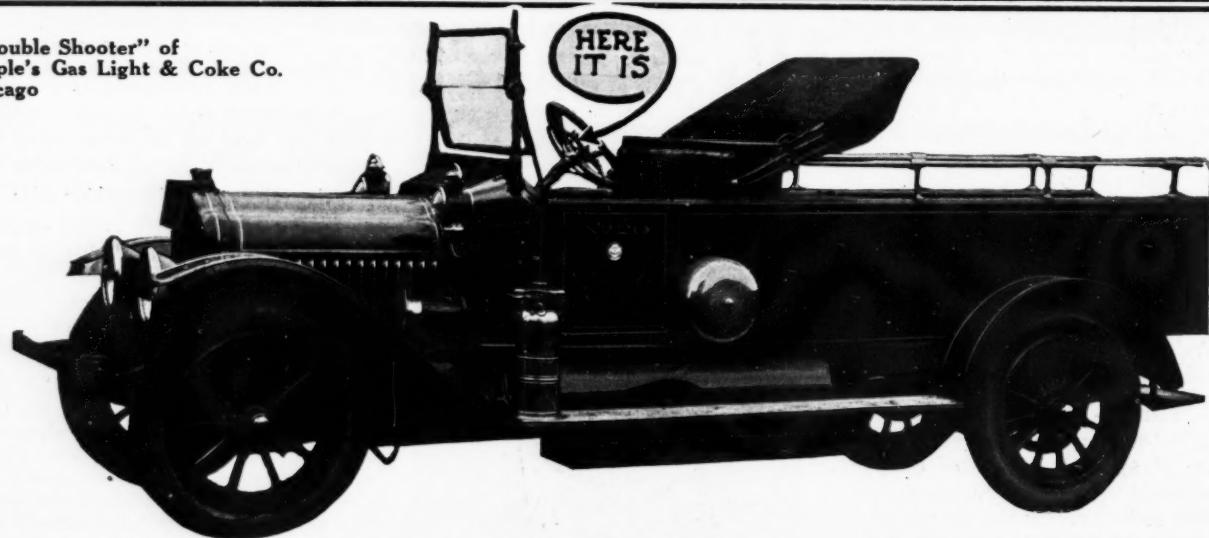
"Bridgeport" Pumps are the best made pumps on the market today. They are made with seamless brass tube barrels which cannot rust. The cylinders are "lapped" into the footbase in the strongest joint possible to be made. The wide-grip handle makes it easy to give a powerful stroke without pinching your fingers. These are but a few of the many good features of "Bridgeport" Pumps.

They're the kind of tire pumps you can depend upon!

Bridgeport Brass Company  
BRIDGEPORT CONNECTICUT



"Trouble Shooter" of  
People's Gas Light & Coke Co.  
Chicago



Where Unfailing Service Is Fundamental—You'll Find the SENG SWITCH

*"Completes the Warning Signal"*

On public service "trouble shooters," fire engines and ambulances, where positive and instant control of the warning signal is essential—you'll find the SENG Switch.

The service the SENG Switch gives on emergency vehicles of every kind, it gives on your own car, for complete safety and driving comfort.

SENG Switch permits use of both hands in driving. Operates with one finger, from any point on circumference of steering wheel. Never fails. Saves price in first accident it averts. At your dealer's or postpaid on receipt of price. Write today.

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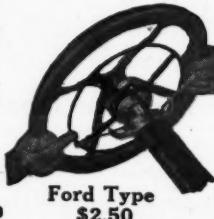
DEALERS WANTED EVERYWHERE



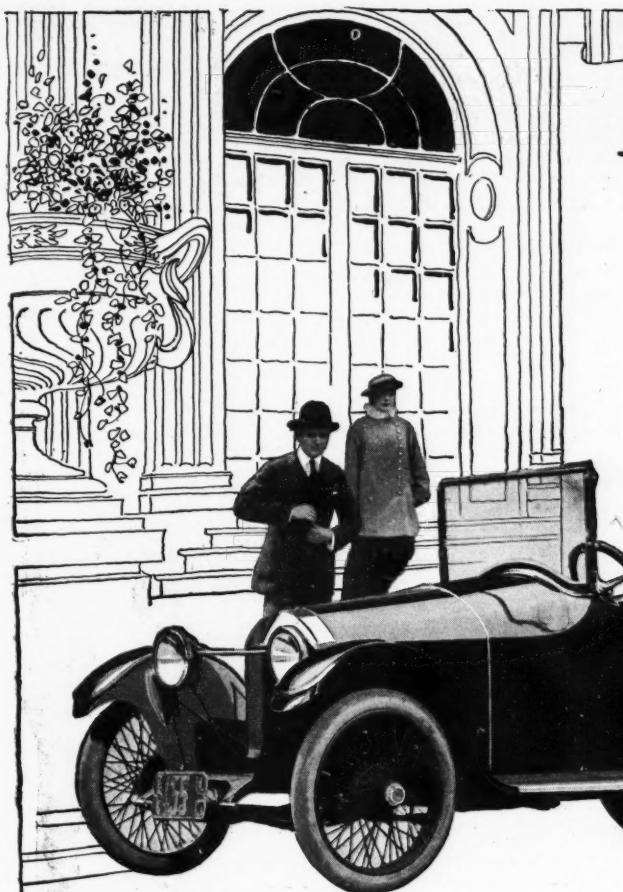
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Ford Type  
\$2.50



## Anticipation

is a looking forward to pleasure—an advance enjoyment of approaching good. A ride in the luxurious Scripps-Booth is thus a double pleasure, combining the joy of anticipation with the surprise of an unexpected riding luxury far beyond the expected realization.

Scripps-Booth cars are beyond all anticipations, and establish new standards of performance and comfort for all motor car comparisons.

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Detroit Mich.

Roadster \$ 775  
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**Four "35" \$885**

The first big Six at a low price.

The car that never had a bad year.

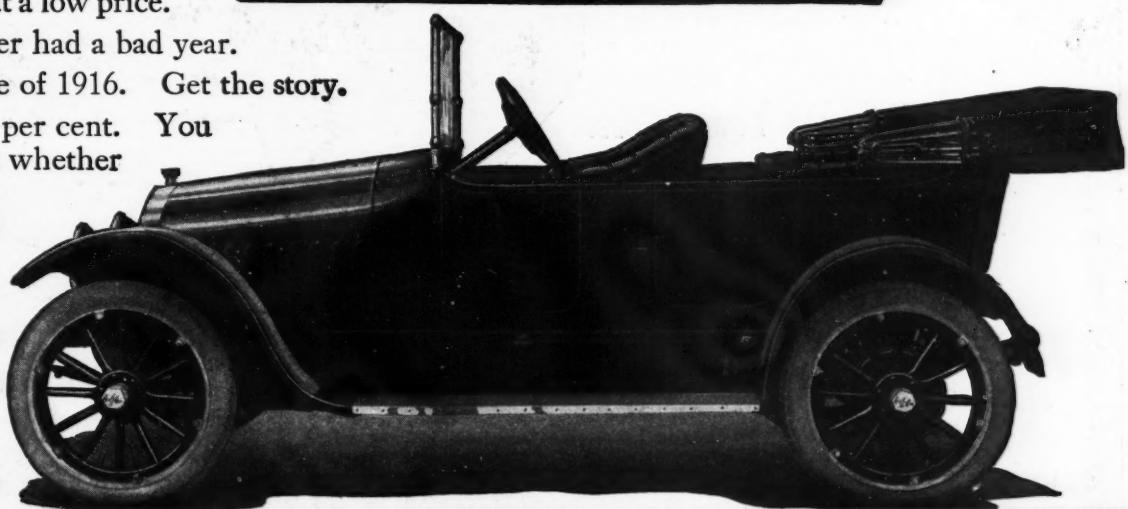
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you.

**Herff-Brooks  
Corporation  
Department A  
Indianapolis, Ind.**

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Or do you merely sell a leading car?  
There's a big difference. Men who  
sell Herff-Brooks lead in their locality  
because they deliver more car for the  
money than anyone else can deliver.  
Herff-Brooks dealers are enthusiastic  
workers. Get this car's specifications and  
our dealer's proposition and you'll see why.



# MAKE \$250<sup>00</sup> A MONTH REPAIRING AUTOMOBILE TIRES

Sounds like a lot of money—IT IS—A WHOLE LOT of MONEY to be earning CLEAR every month—yet it's what hundreds of men we have established in the Automobile Tire Repair Business are making. You let down the DRAW BRIDGE for SUCCESS to enter into your career by getting into business for yourself. The business for you is the one where investment is small—the returns quick and for cash—where the margin of profit is large—the demand for your PRODUCT or SERVICE constant and ever on the increase.

## A Haywood Tire Repair Equipment

Tainty of success in this business is as sure as anything in this world can be—Each year adds thousands of new Automobile Owners—they need YOU to keep their tires in service.

### Here Is Your Opportunity!

Be first to enter this new, big paying business in your town. Open your pockets. Let the dollars pour in. Act quick. Every auto sold means more tires to mend. Automobile business is growing fast—enormous field for tire repairing. Punctures and blowouts are common. Tires need retreading and vulcanizing. Something going wrong all the time. Thousands forced to buy new tires because they can't get old ones fixed. Think of the old bicycle days—repair shops on every corner—all making money—busy day and night. Autos make same proposition over again—only ten times bigger and better. Users of Haywood Tire Repair Plants are making big money. Johnston, Tex., writes: "I have made as high as \$18 in a day." Another man who bought a plant September, 1911, writes he has cleared over \$3000.00. That's going some! Operate a plant as a side line in connection with auto business—garage or as an independent business. Find neighborhood where there's a bunch of autos—get all the steady business besides transient work. Experience unnecessary. You learn quick. Simply follow directions—practice a few days on a couple of old tires and you'll be ready to coin money. Business comes fast and easy.

**HAYWOOD TIRE & EQUIPMENT COMPANY** 720 N. Capitol Ave. The New Money-Making INDIANAPOLIS, IND. Business—Start Now

answers to all of these requirements of Old Dame Fortune—the cer-

**This Man is Making Money**



### Repair Tires At Home

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**\$3.85**

If your warning signal ever failed—or even hesitated—make a change before it fails again.

### Garford Will Do Your Work

No matter what you require from GARFORD—no matter how quick you need it, or how long—GARFORD will do the work. 45° plunger insures absolute safety and instantaneous response from the GARFORD Signal.

Dealers—The GARFORD—nationally advertised—is the most popular warning signal made. Thousands of motorists won't use anything else. Big sales. Liberal discounts. Write today.

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You can't afford to be, for safety, unless it is thoroughly efficient.

**45° Safety Plunger**

**The New Garford Hand Operated**

# BOSCH MAGNETO IGNITION



1st in Sioux City 300-Mile Race  
 1st in Omaha 300-Mile Race  
 1st in Tacoma 250-Mile Race  
 1st in Tacoma 200-Mile Race  
 1st in Tacoma 100-Mile Race

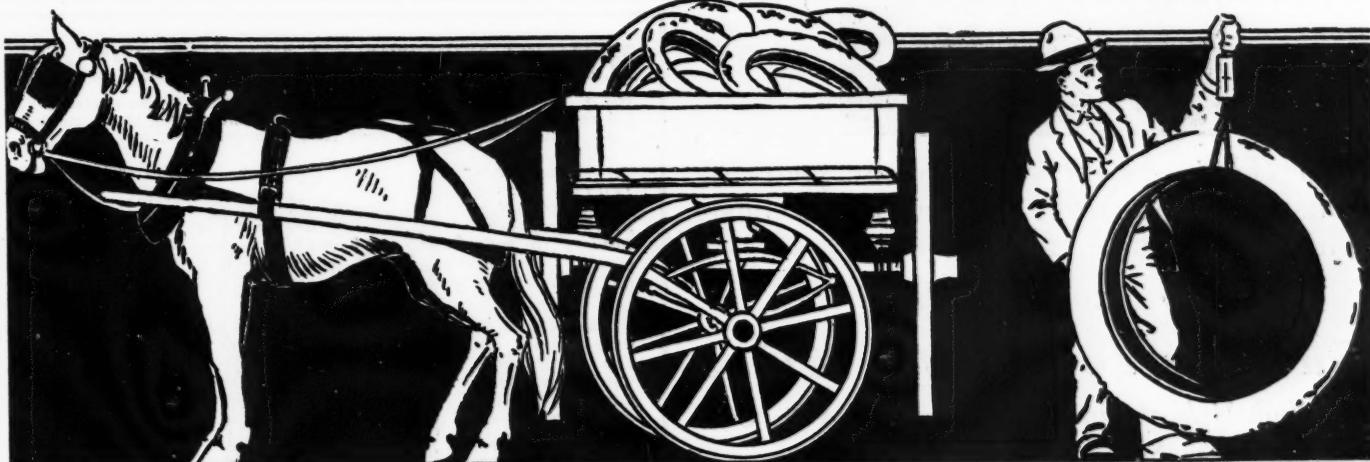


THIS is the ninth clean-cut victory for Bosch Ignition this season—1st, the Vanderbilt; 2nd, the Grand Prize; 3rd, the Indianapolis Sweepstakes; 4th, the Chicago 500-Mile Race, and then the imposing list above.

No other ignition system can show you such a remarkable record—no other system is as reliable, as efficient or as fast—if any system were, it would be tried out and used. There's a reason for Bosch popularity.

For Reliable Ignition Specify Bosch—Be Satisfied

**BOSCH MAGNETO CO., 214 West 46th St., New York**



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**Don't sell them** to "Jimmy the Junkman" just because they are tread worn or rut worn—it's just as unnecessary and just as extravagant as it is to throw away your shoes when the first sole wears thin.

**For the past 3 years** European Motorists have been getting from 10,000 to 15,000 miles out of a set of ordinary tires—while American Motorists have been satisfied with 3,000 to 5,000, but during the past eight months there has been an awakening and over 20,000 American Motorists have followed the European example and "half-soled" their tires with Durable Steel Studded Treads—not only saving \$50.00 to \$200.00 a year, but getting 5,000 miles more service.

**Guaranteed**  
**5,000**  
**Miles**  
**Without**  
**Puncture**



**Whether**  
**Your**  
**Tires**  
**Are Old**  
**or New**

**We Ship on Approval** —without a cent deposit, prepay the express and allow you to be the judge. Durable Treads are quickly applied in your own garage in 30 minutes without special tools.

**Special Discount** to motorists in new territory on first shipment direct from the factory.

Write today—don't run your tires "barefoot" another week—simply mail us a postal stating the size of your tires and we'll send you full information, sample copy of our guarantee and tell you about our Special Discount, without any obligation to you whatever. Write today.

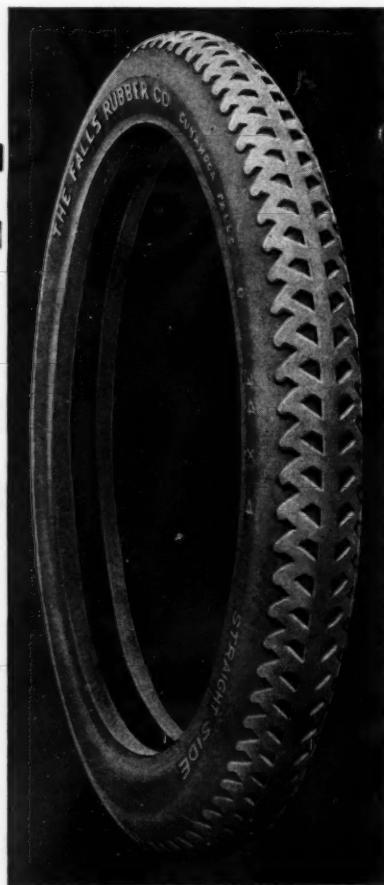
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# FALLS' TIRES



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Write for "The Proof"

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# NEVER SLIP

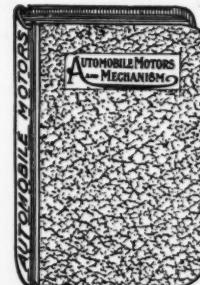
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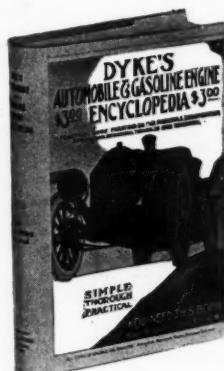
## DYKE'S AUTOMOBILE AND GASOLINE ENGINE ENCYCLOPEDIA

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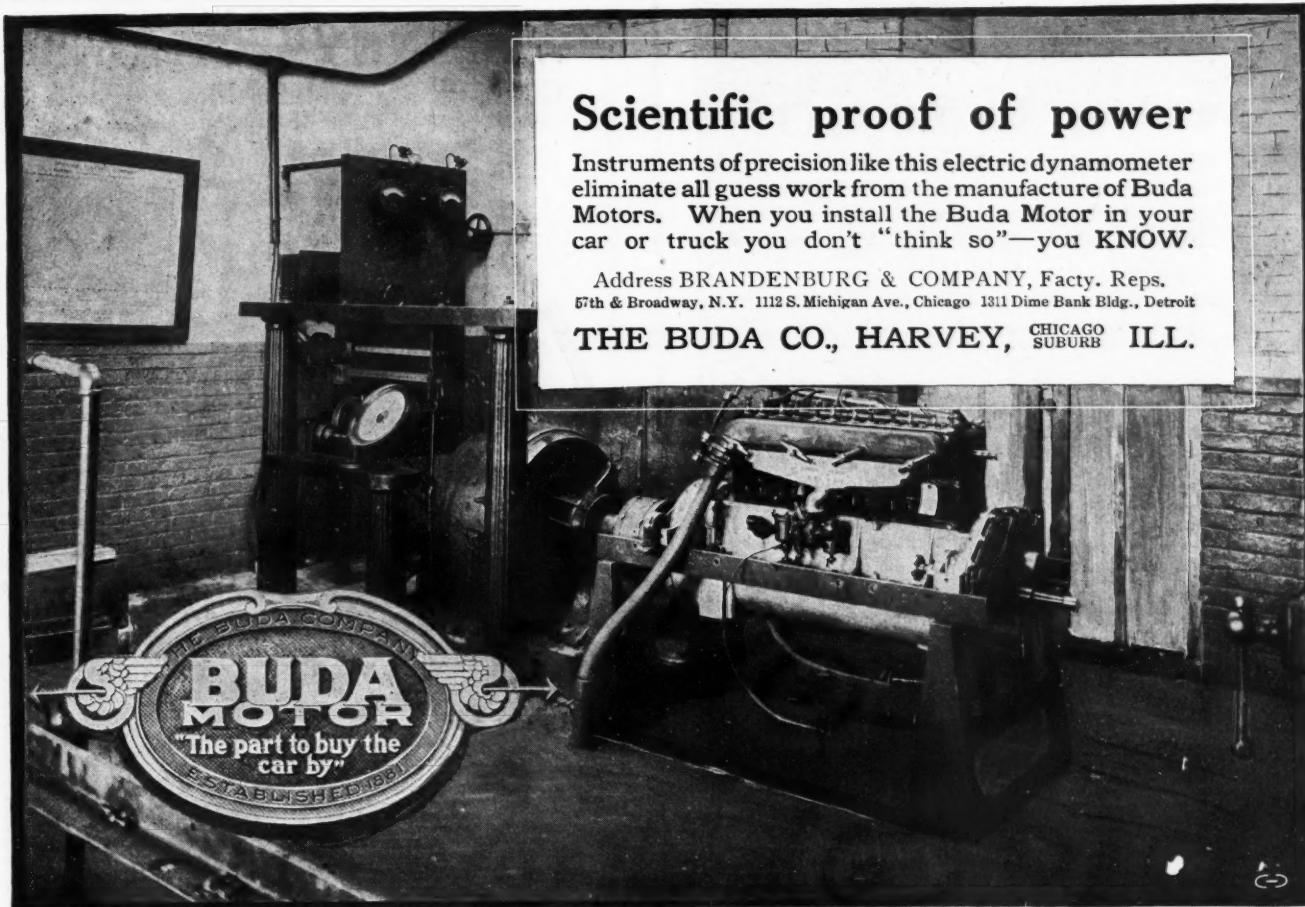
This book is just as the name implies; an Encyclopedia. No matter what you want to know relative to a gasoline engine, you will find it in this book.

Any trouble you can think of—can instantly be located by turning to the Index, then to the Digest of Troubles, which will give the cause and the remedy.

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Instruments of precision like this electric dynamometer eliminate all guess work from the manufacture of Buda Motors. When you install the Buda Motor in your car or truck don't "think so"—you KNOW.

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SUBURB ILL.

**NOW—**

**\$15** For a  
Set of  
**FOUR**

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Price is the only change—50,000 owners and commercial car users have equipped their cars with Hassler Shock Absorbers, many after competitive tests. They all testify for Hassler superiority.



Patented Lever with  
its STOP, holds down  
the LEAF SPRING and  
prevents UP THROW.  
No other shock ab-  
sorber does this.

**HASSLER**

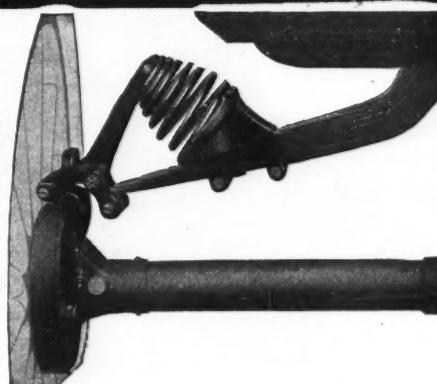
**Absolute Riding Comfort—Perfect Safety  
No Rebound      No Tossing**

The large conical springs do not support the direct weight of the car. Hassler patented lever construction in combination with the regular leaf spring gives absolute riding comfort—eliminates whipping about, tossing and side sway—saves tires—protects the motor from jolts and jars.

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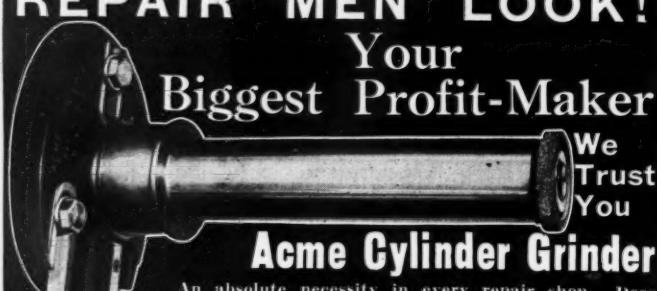
Our dealers' proposition is better than ever. Same big profit. We will send you a trial set. Not sold through jobbers. We protect you. Write for our liberal selling plan.

**ROBERT H. HASSLER, Inc.**  
Indianapolis, Indiana



## REPAIR MEN LOOK!

Your  
Biggest Profit-Maker



### Acme Cylinder Grinder

An absolute necessity in every repair shop. Does the work of a \$2,000 machine slick and perfect. It's a corker! Sold direct from our factory under an iron-clad guarantee and easy payment plan.

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If it fails to do all we claim for it, or is defective in workmanship or material, whereupon we refund every cent you paid.

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anywhere, if honest. We haven't lost faith in mankind. Therefore we'll trust anybody who wants to do the right thing.

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**THE ACME GRINDER CO., Minneapolis, Minn.**

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The Most Practical for Motor Trucks

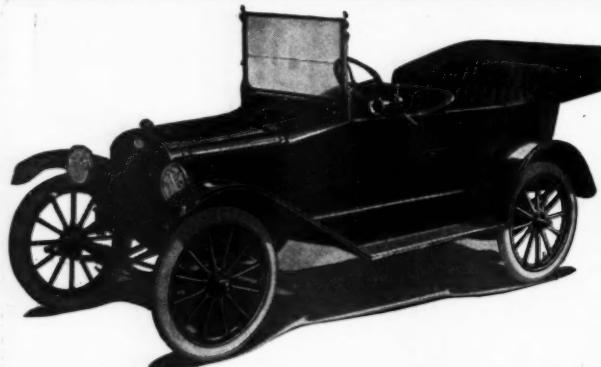


**THE WHITNEY MFG. CO.**  
HARTFORD, CONN.

Chains

Keys

Hand Milling Machine



**METZ 25<sup>99</sup>**

*The Quality Car*

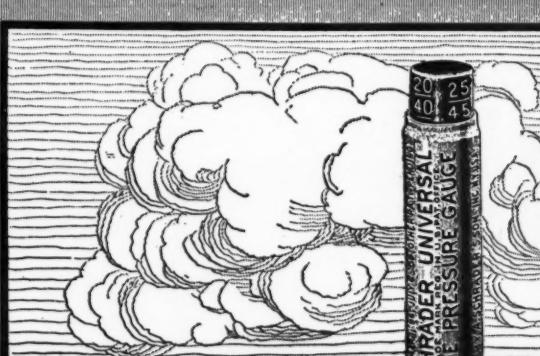
### A GREAT BIG PROPOSITION FOR DEALERS

This new Metz Touring Model will help you to do a much bigger business, and a very profitable business. The demand for just such a car as this will show a greater increase this year than ever before.

Listed at \$600, its equipment includes Gray & Davis electric starter and electric lights, rain-vision windshields, one-man top, luxurious upholstery, 32-inch wheels, 3½-inch Goodrich clincher tires, Bosch magneto, Hyatt bearings, gasoline gauge, speedometer, signal horn, tools, etc. It is a handsome appearing car, a car any owner will be proud of, and so simple in operation that a woman can safely drive it. It will pay you to handle the METZ.

*Write for particulars and New Catalog "K"*

**METZ COMPANY, Waltham, Mass.**



# Schrader

A TIRE begins to overwork and overwear the minute the air pressure in it falls short of the inflation prescribed for it by its makers. There is no method yet discovered of ascertaining the pressure in the inside of a tire except by the use of a pressure gauge. A casing containing 40 lbs. of air looks and feels exactly like a casing containing 80 lbs. If your tires require 80 lbs. and you only give them 40, they're on the quick road to the scrap heap.

USE A

### SCHRADER

UNIVERSAL TIRE PRESSURE GAUGE

and save your tires

PRICE \$1.00

For sale by Tire Manufacturers, Jobbers, Dealers, Garages, or

**A. SCHRADER'S SON, Inc.**

783-791 Atlantic Ave. Brooklyn, N. Y.

# NOXAL SHOCK ABSORBER

\$10

Per  
Set

**"A mile of comfort  
for every mile you ride"**

A \$10 bill buys a set of **guaranteed-for-life** NOXAL Shock Absorbers—the most efficient and easiest riding, due to their simple construction and small friction surfaces.

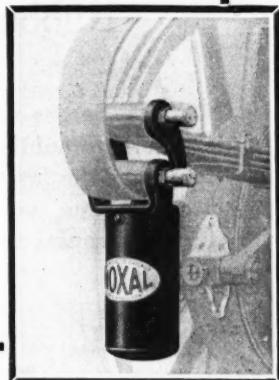
NOXAL Springs absorb about 3 times the vibrations absorbed by the best leaf springs. NOXALS have but one friction point. Others have four to eight. NOXALS have fewer parts—all machined, no castings. Easily attached by anyone without filing, fitting or machine work.

**Sold on  
10 Days' Trial**

Write for free booklet. We also make NOXAL Shock Absorbers for Ford cars. Set of 4, \$8.

**Dealers Wanted**

**The Noxal Company**  
21 S. Clinton St. Chicago



## The Best Salesman on Earth Can Not Talk Quality Into a Tire

It will pay you to sell these tires that are made of rubber—not talk! A tire is no better than its source—it can't give more mileage on the road than is built into it in the factory. *"Miller Builds Mileage In For You."*

The process by which Miller tires are built thoroughly vulcanizes, makes a perfect unit of rubber and fabric, without burning the life out of either, and with no point of cleavage in the construction.

## Miller GEARED TO THE ROAD Tires

This method of vulcanization—the retention of the vegetable wax and oil—means life in the fabric and rubber. It results in safety—freedom from blow-outs, and additional miles of wear in Miller tires, as thousands and thousands of motorists have found out.

Write for our dealer's proposition. It is a better one—just as Miller tires are better.

**The Miller Rubber Co.**  
Akron, U. S. A.

# MERCER

The Mercer is the only high grade American car built in "fours" exclusively.

*Literature Mailed on Request.*

**Mercer Automobile Co.**

800 Whitehead Road  
Trenton, N. J.

22-70  
Sporting  
Four-Passenger

# HEINZE

## Electric Horn

Special for Model T Fords

The HEICO is the first and only electric warning signal made to fit the requirements of Model "T" Fords. Operates direct from flywheel magneto. Made with least number of parts. Consumes little current. Always responds instantly to touch of switch. One finger is enough.

Dealers—HEICO sends the bulb horn and other warning signals for Fords, to the scrap heap. Every Ford owner wants a HEICO. Liberal discounts. Big sales. Write for descriptive literature.

HEICO gives loudest clearest warning. As strong as most expensive signals. Under hood type. Latest style. No upkeep expense. At a price you can afford. Price, \$3.50, complete with cable-switch and attachments.

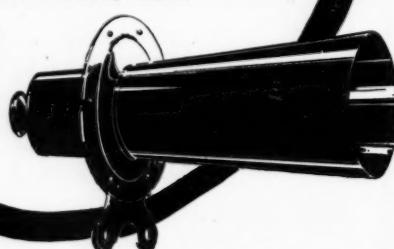
Sales Office:

HEINZE ELECTRIC CO.

DETROIT

Factories: Lowell, Mass.

\$3.50



Branches:  
New York  
City, 1876  
Broadway  
Chicago, Ill.,  
1956 Michigan  
Ave., Minneapolis,  
Minn., 38 S. 11th  
St. New England Agent,  
Arthur P. Homer, 184 State  
St., Boston, Mass.

## For Standard Equipment

Reliability, durability, and service are demanded of every unit that is accepted as standard equipment in any vital part of a motor car.

## Speer Metallic Brushes

—are regularly and successfully used on a large number of electrical appliances for automobiles.

Manufacturers who make SPEER Metallic Brushes part of their products, get quick returns on heavy sales.

Dealers, keep a stock of SPEER Metallic Brushes to satisfy customers' demands.

Good discounts  
and profits. Write

Speer Carbon Co.  
Saint Marys, Pennsylvania



## Bull Dog Quality

Represents the Highest Skill in Rubberized Fabrics

Mohairs, Serges and Numotor Fabrics for the best in Automobile Tops, Curtains, Upholstery. Combines the latest modes to please the most discriminating, yet of a quality that the most careful manufacturer is pleased to guarantee.

Send for Samples

L. J. MUTTY CO.  
BOSTON, MASS.



## VANGUARD DeLuxe Cowl Shields for Fords

The combined Windshield and Cowl that adds to the comfort and safety of the car's occupants and vastly improves the appearance of Ford cars.

A handsomely designed and finished Shield that deflects cooling air currents into the well of the car and furnishes clear vision in storms—a genuine "safety" windshield. Locks in any position automatically.

Easily installed in place of the regular Ford shield. For sale by jobbers and accessory dealers or can be obtained direct from manufacturers.

In ordering, state if wanted for 1913-14 model.  
Vanguard adjustable shield for 1915 model \$10.00.

Dealers—Your discounts and terms are liberal.

VANGUARD MANUFACTURING COMPANY,  
DETROIT, MICHIGAN



# Guaranteed for 10,000 Miles



BRICSTON Pneumatic Tires are guaranteed for 10,000 miles and under a specific 10,000 mile written service guarantee. What more can you ask of a tire? With Bricstons Tires, punctures, blow-outs and rim-cuts are eliminated—they are proof against ruts, oil and gasoline. Resilient and easy riding, too.

## Try Them at Our Risk

Give Bricstons Tires a free trial on your own car. Put them to test at our expense. Find out why Bricstons Tire sales are increasing daily.

### Your Tires Rebuilt the Bricstons Way

If the fabric in the tires now on your car is in good condition, we can take them and make them proof against rim cutting, punctures, blow-outs, sidewall breaks, skidding, ruts and oil and give you thousands of miles of additional service.

Write today for full information about Bricstons Tires, Tire Rebuilding and details of our liberal Free Trial Offer.

THE BRICSTON MFG. CO.  
1275 Bricstons Bldg.,  
Brookings South Dakota

## Bricstons Pneumatic Tires



## Ever-Tight Piston Rings Prevent Power-Waste

If your motor shows a disposition to "lie down"—or carbon deposits cause trouble—specify Ever-Tight piston rings to your repairman.

"Ever-Tight" is the only perfect three-piece ring made. Its flexibility is remarkable. Adapts itself instantly to an out of round cylinder and makes compression perfect. By the same token it makes friction less. Don't pay good money to reboore old cylinders—simply install "Ever-Tight" rings—

### "For Leaky Cylinders"

and your engine will work like a new one. Beware of substitution when ordering. If local dealers do not carry the Ever-Tight ring, write us.

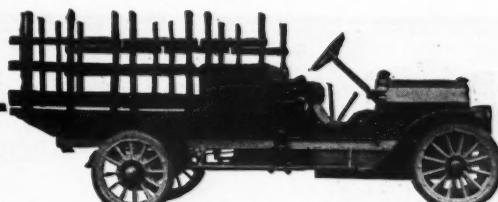
Jobbers and dealers wanted

The Ever-Tight Piston Ring Co.  
1432 Chestnut Street  
ST. LOUIS, MO.

AUG. 6-1912



When Writing to Advertisers, Please Mention Motor Age



Model B-3, 1-ton Truck, Complete with Express or Stake Body, \$1500. Chassis only, \$1400.

## Menominee Trucks fit your business

Whatever your needs, there's a MENOMINEE Truck that fills the bill.

There's a model for every kind of hauling.

## "The MENOMINEE" TRUCKS

FOR ECONOMY

Medium, light or heavy—it's all the same to the MENOMINEE, because there is always one at just your size and price.

See the 3 models—1,500 lbs., 1 ton, 1½ ton; \$1,125, \$1,400, \$1,800.

Take your choice, and let it make money for you now.

Dealers, write for catalog and territory.



D. F. Poyer CO.  
Menominee, Mich.



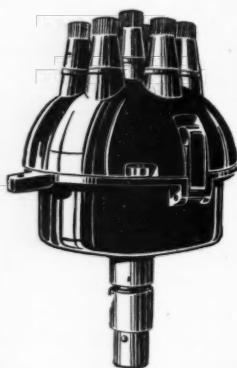
## DIXIE 20<sup>th</sup> CENTURY MAGNETO

The DIXIE delivers a full spark at lowest engine speed—giving the motor a faster get-away than any other form of magneto or ignition system can possibly do.



SPLITDORF  
Electrical Co.  
NEWARK, N. J.

(All SPLITDORF features are fully covered by patent or patents pending)



## The Atwater Kent Ignition System

Used by one-quarter of all 1915 U. S. A. built cars, exclusive of Fords.

4934 STENTON AVENUE  
PHILADELPHIA, PA.



## SPARTON

Hand Horns  
NEW PRICE

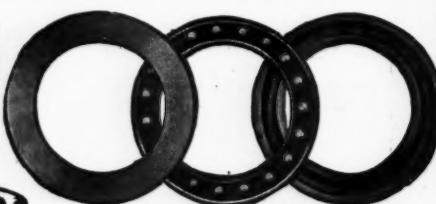
\$4.00

DELIVERIES NOW

ALL DEALERS

THE SPARKS-WITHINGTON CO., JACKSON, MICH.

The Bearings Company of America  
Sales Department, 250 W. 54th St., New York



COMPLETE THRUST BEARING

RADIAL RETAINERS

MADE IN AMERICA

Manufacturers of Star Radial Ball Retainers, Star Ball Thrust Retainers, Star Complete Ball Thrust Bearings

## Twice the Light With the Same Current The NITRO-ARGON Headlight Bulb

ANY VOLTAGE FOR 6 TO 14. ANY CANDLE POWER UP TO 32

Twice as white and intense a light of the ordinary tungsten bulb with the same consumption of current.

Price \$1.50 per pair

Send money order or check

Morelite Nitrogen Lamp Co., Longacre Bldg., N.Y.

## Gasoline Can't Explode

You can build a fire under a McNutt can—you can hold a match in the opening of a McNutt can—it will never explode.

Hundreds of tests have been made by the New York and other Fire Departments, but no McNutt can has ever exploded.

Also—these cans prevent loss by evaporation and are so well made and reinforced that they will outlast 20 ordinary containers.

SEND FOR CATALOGUE—Our catalogue describes cans for every use and gives prices. Tear out the advertisement now to remind you to send for it.

DEALERS—These cans and devices sell on sight; remarkable opportunity; write for proposition.

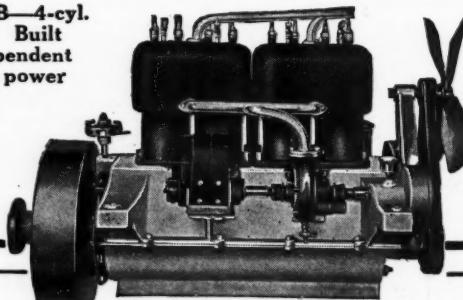


JOHN C. EAMES, Inc.

320 Broadway

New York

Model B—4-cyl.  
4  $\frac{1}{2}$  x 5. Built  
as independent  
or unit power  
plant.



4-Cyl.  
Models  
Model M  
4  $\frac{1}{2}$  x 5  
Model B  
4  $\frac{1}{2}$  x 5  
Model 11  
5 x 5  
Model 12  
5  $\frac{1}{2}$  x 6  
Model 12  
6 x 6  
6 Cyl. Model  
4  $\frac{1}{2}$  x 5

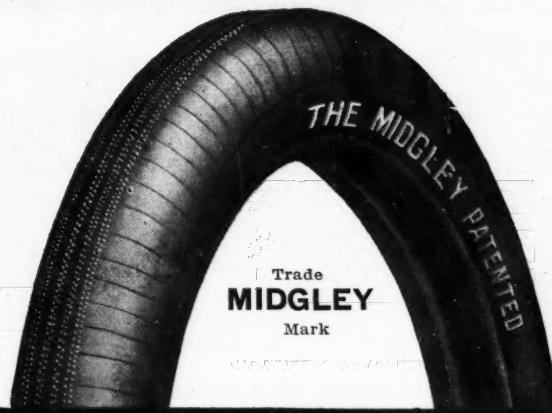
The Perfect Balanced Four  
Been making good for 15 years on pleasure and commercial cars. Special model for Elmore and White Steam cars. Write BRENNAN MOTOR MFG. CO. Syracuse, N. Y.

BRENNAN MOTORS

## SALISBURY

AXLES WHEELS  
PROPELLERS

Salisbury Wheel  
& Mfg. Co.  
JAMESTOWN, N.Y.



### Midgley Trade Is a High-Class Trade

Bringing Profit Not Only on Midgleys,  
but on the Other Goods You Carry

**M**IDGLEY Tires are Quality Tires. Quality goods attract quality customers. A discriminating trade—a trade with the money and the willingness to spend it, not only for Midgleys but for the other goods you carry.

#### Midgley Patented Wire Tread Tires

are providing dealers everywhere with a creative source of profit. A force that will manifest itself in your business if you handle Midgleys.

*We know you will be interested in learning more about Midgley Quality and Midgley Profit. Please ask us for Booklet No. 11.*

Midgley Non-Skid, Plain Tread and  
Inner Tubes manufactured only by

**The Midgley Tire & Rubber Co., Lancaster, O.**

306

Auto-thieves can't negotiate  
Powersteel Autowlock. Men  
who drive to business, or leave  
their cars standing long at the curb,  
find "Autowlock" a convenient and de-  
pendable safety-device.

#### POWERSTEEL AUTOWLOCK

is just long enough to slip around a wheel rim and a spring, or a spare tire and its holder. Snaps together instantly with a pickproof lock. So small you can tuck it under a cushion when not in use. Two dollars is a small sum for car-insurance. Buy "Autowlock" today and be safe. All dealers sell Powersteel Autowlocks.

**BASLINE AUTOWLINE** is about 25 feet of  $\frac{1}{4}$ -inch Yellow Strand Powersteel wire rope for towing. Has handy patented snaffle hooks for quick attaching. In convenient patented package; price \$3.95, east of Rockies.

**POWERSTEEL TRUCKLINE** is Basline Autowline's "big brother"—for heavy towing. Saves many dollars and costs few. Price, east of the Rockies, \$6.50. If your dealer cannot supply you, order of us direct.

FREE. Illustrated circulars. Write

#### Broderick & Bascom Rope Co.

813 N. 2nd St., St. Louis, Mo.  
New York Office 76 E. Warren St.  
Makers of famous Yellow Strand  
Powersteel wire rope.



## De Palma

was one of the  
first to wear the

## Shanhouse Motorsuit

There are now over a million auto owners and garage men using the Shanhouse Motorsuit to protect their clothes from dirt and grease while working around their cars.

The growing demand for the "Shanhouse Make" is convincing evidence of its satisfaction. An Accessory every motorist should have in his car at all times.

This is a one-piece garment made of a high grade olive khaki. Covers you from head to foot.

If your dealer doesn't carry it, send \$2.00 for  
one prepaid. Give chest measurement and leg  
length. Money back if not entirely satisfactory.

**THE SHANHOUSE CO., Rockford, Ill.**

## THE SIMMS HIGH-TENSION MAGNETO

AND

## SIMMS-HUFF MOTOR GENERATOR

Increase the power of your car by equipping it with a Simms High-Tension Magneto—the most efficient ignition system for gasoline motors.

The Simms-Huff Motor Generator is the most powerful, simplest, lightest weight starting and lighting generator.

Automobile experts acknowledge that we make the "sure fire" starter.

## SIMMS MAGNETO COMPANY

East Orange, N. J.

Manufacturers of the most reliable ignition, starting and lighting systems for automobiles

## Illinois Automatic

### Windshield Hinge Makes Your Ford Shield Clear Vision, Ventilating



\$5

Keeps you in a cool draft all the time you drive. Crowds out the heat from the motor and makes for perfect comfort, these hot days. The only windshield hinge made of tempered steel and guaranteed for the life of your car. Ready to attach in old screw holes. Don't pay more than \$5 for windshield comfort.

For 1915 Fords With Cowl Dash

Dealers Wanted

ILLINOIS BRASS MFG. COMPANY  
11-17 S. Des Plaines Street, Chicago

## DOUBLE SEAL TIRE VALVE



No tool needed to seat or remove Valve



Interchangeable with All Stems

Fifty Cents Per Dozen  
Single Valves, Five Cents

Double Seal Tire Valve Co.  
1790 Broadway  
New York City

## Add to Garage Profits by Oxy - Acetylene Welding

Savings made please your patrons and pay good substantial profits.

### PREST-O-LITE

#### Dissolved Acetylene

(Ready-made carbide gas) adds to the efficiency and usefulness of any good welding equipment. We furnish thoroughly high grade welding apparatus for \$60.00. The average user will also need gas cylinders at an additional cost, and about \$10.00 worth of welding supplies. Truck and special equipment for cutting operations at extra cost.

Send for details of Prest-O-Lite Service for Oxy-Acetylene Welding.

The Prest-O-Lite Co., Inc.  
The World's Largest Makers of  
Dissolved Acetylene  
233 Speedway Indianapolis, Ind.



## Hand Pumping Is Just Physical Torture!

But you will enjoy pumping tires with a

### MAYO SPARK PUMP

Simply substitute the pump for any convenient spark plug. The motor does the work—lets the motorist out.

Price, complete with 12 ft. hose and gauge, \$10. MAYO Q. D. Spark Plug, \$1.50 extra. Try one Free on your car for 30 days.

MAYO MFG. CO.  
55 E. 18th St., Chicago



The Late Revised Edition at Least 100 Per Cent Better

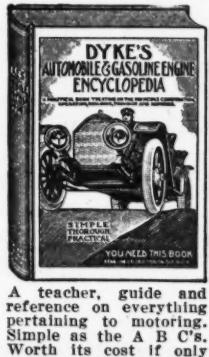
### Enlarged---Revised Edition Now Ready

#### Some of the New Subjects Added

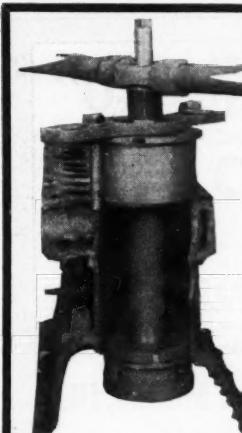
Ford Instruction, Trucks, Tractors, Electric Starters, Generators and Lighting Systems—up to date. Six, Eight and Twelve Cylinder Engines. Repairing subject greatly improved. 1750 illustrations instead of 1200. 640 pages instead of 596. 49 instructions instead of 40. Entirely revised.

ADDRESS BOOK DEPT.

Class Journal Company  
910 So. Michigan Ave. Chicago, Ill.



A teacher, guide and reference on everything pertaining to motoring. Simple as the A B C's. Worth its cost if only placed on the shelf and used as a reference. Price ..... \$3.00



### Increase Garage Profit by Reborning Cylinders

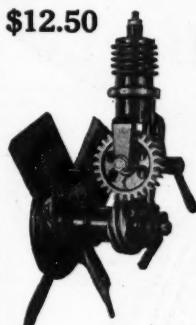
Install

### STORM & O'HAIR Boring Machine

This machine is adjustable to various sizes from  $3\frac{1}{2}$  to  $4\frac{9}{16}$  inches. Does work quickly and accurately, leaving a gun barrel finish. Can be operated by any one. Can reboil cylinder in fifteen minutes. Write for description.

Storm & O'Hair, Thompson, Ia.

\$12.50



### Oakes Fan-Horn-Pump

all three in one assembly—interchangeable with fan on Ford in ten minutes. Simple and efficient. Pumps only when you want to inflate tires. Touch lever—that's all! Finest material—guaranteed.

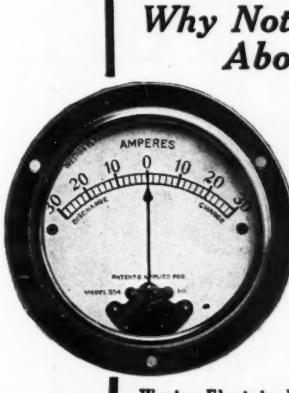
#### Horn in Center of Fan

Oakes Beartone horn is motor driven, an integral part of cooling fan. Press button at driver's seat—that's all. Any volume or range needed—instant response, never fails. No gears, batteries, wires, or complicated mechanism. Oakes Fan is the best—outwears the car. Write for full particulars or dealer's proposition.

Fan-Horn \$5, Fan-Pump \$7.50, Kranklock 75c

for FORD

THE OAKES COMPANY  
Indianapolis, Ind.



Why Not Be Sure  
About Your Lights  
and Starting Motor?

# Weston

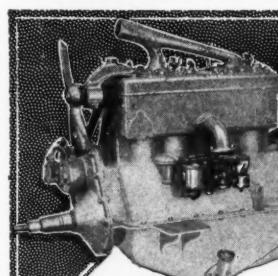
#### Model 354 AMMETER

#### On Your Dashboard or Cowl

will keep you posted every minute regarding electrical conditions. It gives you warning of approaching trouble. Its exact information is invaluable—the cheapest and best insurance you can buy.

Write for full information.

Weston Electrical Instrument Co., 10 Weston Ave., Newark, N.J.  
Branches in the Larger Cities



THE  
RUTENBER  
MOTOR

Used in  
America's Best Light  
Weight Cars

—costs less to buy and  
maintain — and gives  
service equal to motors twice as  
expensive.

The Rutenber Motor Co.  
MARION INDIANA  
Chicago Office, ..... 10 S. La Salle St.

Model 20

$3\frac{1}{2} \times 5$   
4-cylinder

**Standard** Chain and Chainless  
DETROIT USA TRUCKS

### Meet Every Demand

Dealers should carefully consider the rapidly growing demand for standardized heavy duty, double duty 4-cylinder trucks.

The standardized "STANDARD" meets this demand in every way  
Send for booklet B23 describing all capacities

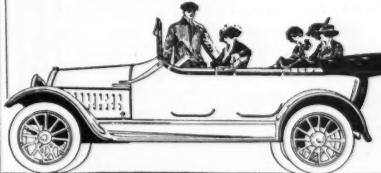
STANDARD MOTOR TRUCK CO., Detroit, Mich.

### 1916 Inter-State \$850

"The Thousand Dollar Car" at \$150 Less  
Same Car—New Price

Powerful, valve-in-head motor  
Big, Full Five-Passenger Body  
Genuine Leather and Curled Hair  
Floating Axle  
Underslung Rear Springs

Over-size Tires  
Two Unit Starting, Lighting and  
Ignition  
"The Easiest Riding Light Car in  
America"



Inter-State Motor Co.  
MUNCIE, INDIANA

### MASTER CARBURETERS

Harry Grant with Sunbeam  
and Master Carbureters—the  
sensation of the Chicago Race.  
500-mile non-stop record.  
Average 95.6 miles per hour.

MASTER CARBURETER CORPORATION  
1523-31 Fort St. West, Detroit, Mich.

Pacific Coast States—Master Carburetor Co., Inc., Los Angeles, Cal.

**DELCO**

#### ELECTRIC LIGHTING CRANKING IGNITION

The man who sells a Delco  
equipped car has a talking point  
with a wonderful appeal to it.

THE DAYTON ENGINEERING  
LABORATORIES COMPANY  
Dayton, Ohio



## FREE ROAD MAPS

New England States  
New York State  
New Jersey  
Trans-continental, showing all trails

Pennsylvania  
Southern States  
Middle Western States

These maps were prepared for us by the Automobile Blue Book Co. Copies may be obtained from any dealer displaying the sign with the orange disc, or mailed on request

There is More Power in  
THAT GOOD GULF GASOLINE and  
SUPREME AUTO OIL

GULF REFINING COMPANY  
Dept. 1875, Frick Annex  
PITTSBURGH, PA.



Barring the unforeseen, each retail buyer of a new Ford car between August, 1914, and August, 1915, will receive from \$40 to \$60 as a share of the Ford Motor Company's profits.

Readily adaptable to all situations, the Ford is the car for your tours and camping expeditions, as well as being a general utility in the demands of everyday life, averaging about two cents per mile to operate and maintain.

Touring Car, \$490; Runabout, \$440; Town Car, \$690; Coupelet, \$750; Sedan, \$975; f. o. b. Detroit with all equipment.

Ford Motor Company  
Detroit, Mich.

## THE POWERFUL, SILENT SPHINX

\$695

A REAL AUTOMOBILE

The lightest, strongest, most serviceable and economical machine of its kind ever built. 112 inch wheel base. Electrically started and lighted.

Sphinx Motor Car Company, York, Pa.

## REPUBLIC TIRES

PLAIN, "WM"  
AND STAGGARD TREADS

TRADE MARK REGISTERED  
U. S. PATENT OFFICE

## Moline-Knight "40" F. O. B. \$1475 Factory

40 horsepower, 5 passenger touring and 2 passenger roadster, 118-inch wheel base, 34x4-inch tires (non-skid rears), spiral bevel gear rear axle, weighs 2,896 pounds ready for the road, Auto-Light starter, high tension ignition, complete equipment, 50 horsepower touring, roadster, sedan, limousine models—\$2,500 to \$3,800.

Moline Automobile Co., East Moline, Ill.

## Searchlight Welder

4\$100  
Outfit  
for

\$50

for oxy-acetylene  
Welding  
has increased the profits  
in repair work in a great  
many garages

LIBERAL TRIAL PLAN ON APPLICATION  
The SEARCHLIGHT CO.  
1034  
Karpen Bldg.  
CHICAGO

NOT INCLUDING TANKS

## The Cornelian Light Car



\$410—Top and Windshield \$25 Extra

First car to qualify for the Indianapolis 500-mile race, breaking all world's records for cars of its class.

*The Car with a Great Future*

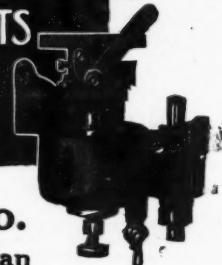
Blood Bros. Machine Company, Allegan, Mich.

Makers of the famous Blood Bros. Universal Joints

## HOLLEY CARBURETOR

NO MOVING PARTS  
ONLY ONE ADJUSTMENT

WRITE FOR  
PARTICULARS



Holley Brothers Co.  
Detroit  
Michigan

## WINTON SIX

The one big motor car fact of 1915 is that now, for absolutely the first time in the entire history of the automobile industry, you can buy in the \$2285 New-Size Winton Six a genuinely perfected high-grade car at less than \$3000.

Write for catalog today.

THE WINTON COMPANY  
424 Berea Road, Cleveland, Ohio  
*World's First Maker of Sixes Exclusively.*

Ordinary Plug      SU-DIG Plug      To magneto

**TWO SEPARATE SIMULTANEOUS SPARKS**

The power of your engine depends on the quickness of combustion in the cylinders. With one plug per cylinder it is quick. But with added (giving two sparks at once) it is much quicker. A marked increase in gasoline mileage results, and a great gain in hill-climbing ability and general efficiency.

Use present magneto or battery system. Ask your dealer, or write us today.

**SUPERIOR MOTOR POWER COMPANY**  
(Formerly Superior Motor Specialty Co.)  
36 Irving Place      New York City

**SAMPSON**  
FEATHEREDGE  
INNERTUBE PLUG

Repairs forever any puncture or small blowout in 1½ minutes. No vulcanizing—no cement—no patches. Sampson Plugs are never to leak or injure tube or shoe. Money back if you want it, at any time. Sampson Plugs come in three outfits: No. 1—Tool and 6 Plugs in carton, \$1.50. No. 2—Tool and 12 assorted plugs in black enamel box, \$2.50. No. 3—Motorcycle kit; tool and 6 small plugs in stout wallet, \$1.50.

**Stevens & Co., 377 Broadway, N. Y.**

## How Many?

When dealers see  
**PARKER HYDRAULIC**  
Pressed Steel Wheels

it is usually a case of how many. They know they'll sell because these wheels have all the advantages of wooden and wire wheels and the disadvantages of neither.

Our proposition to dealers is attractive. Write for it today.



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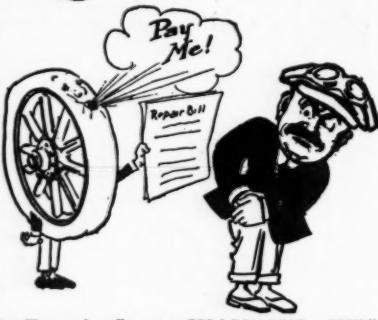
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# The Clearing House—continued.

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Bosch Magneto DU4, with switch, wire, leather cover, and Oldham coupling	\$40.00
Lot of Eiseman and Bosch shaft bearings, complete	11.80
Interruptors, complete	4.35
\$1.50 Mosler Spitfire spark plugs, per doz.	4.00
125 black and nickel hand warning signals	
Regular, \$4.00 Latest style	2.95
Left only 75 pair of those swell electric head lights, per pair	4.50
six pair	26.00

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Four pass. Car-Nation bodies, not upholstered	\$ 15.00
Five pass. Henderson, Marion and Midland bodies	20.00
One-man top with curtains, 52" wide	25.00
34x4 Q. D. wheels, twelve 1 1/2" spokes, set of four	12.00
34x3 1/2 Q. D. wheels, ten or twelve spokes	3.50
Wheels with 2 1/2" solid tires, for Krit or Ford cars, set of 4	35.00
New four cylinder, 4x5 motor, 3 point suspension, fan pump and clutch	120.00
I beam front ball bearing axles, with hubs	15.00
Rear axles 3 1/2-1 ratio, New Departure bearings with hub	50.00
New multiple disc clutch, 35 H. P.	35.00
Cone clutches, 14" diameter with joint 1" square	20.00
Pressed steel frames, eight sizes \$5 to 2x49, 1/2" elliptic springs, 7 leaves, pair	15.00
Hyatt, Timken and Annular bearings	7.00
Radiators and gears made for all cars	

Get Our Catalogue.

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1827 McGee St. Kansas City, Mo.

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General line of repair parts for all old models MAXWELL cars at the old list price. All parts are new.

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Why pay 20% advance for your repair parts for the old models of MAXWELL cars? We can supply 90% of your wants at the old list price. Transmission gears and parts in stock for Cadillac, Case, Croxton, Dorris, Elmore, Moline, Moyer, Overland, Regal, Selden, Standard, Velle and 75 others at cut prices. Why pay more? Send for price list.

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We have in stock all repair parts for every Michigan model and ship orders for repair parts within 24 hours after order is received in our office.

We guarantee absolutely accuracy of every part. Prices same as charged by old Michigan Motor Car Company.

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Successors to Michigan Motor Car Co. of Kalamazoo DETROIT, MICHIGAN

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**RACING BODIES AND SEATS**  
for all chassis—guaranteed to fit.  
Fenders, Hoods, Tanks, Radiators  
STANDARD AUTO SHEET METAL WORKS  
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25 H. P. Unit Power Plants	\$140.00
Engines only	100.00
30 H. P. Unit Power Plants	170.00
Engines only	125.00
40 H. P. Unit Power Plants	200.00
Engines only	155.00
55 H. P. Engines only	\$250.00

All Four Cylinder Four Cycle

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Flanders 20, 3 speed	75.00
Great Smith, 4 1/2 x 5	75.00
Continental, 30 H. P.	75.00
Oswald, 4 cyl., 4 x 4 1/2	75.00
Moon, Model C, 4 1/2 x 5 1/4	75.00
Stoddard Dayton, 8-K, 4 3/4 x 5 1/4	75.00
Regal 30, 4 x 4 1/2	75.00
Bergdoll, unit power plant, 3 3/4 x 4 1/2	150.00
Jackson, unit power plant, 4 1/2 x 4 1/2	150.00
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Above are used motors, guaranteed to be in good shape. Will take other motors in on trade.

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All equipment for changing your car to a Speedster

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Write for prices on other makes.

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Plain to fit Ford	\$17.00
'V' shape (brass) to fit Ford	23.00
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Buick 19	28.00
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Hudson 20	29.00
Chalmers 30	30.50
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Studebaker 35	34.00
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Regal 20	32.00
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Parts for all old types, including Goodyear '07 LARGEST DISTRIBUTORS DEALERS—Write for Prices

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Schebler Model L 1 1/4"	8.00
Marvel, Kingston or Holly Carburetors 1 1/4" choice	8.00
Prest-O-Lite tanks, Model B, filed	11.50
Gas generators	.90
Stewart speedometer, Model B, \$50.00 list	12.50
Stewart speedometer, clock and electric light combined, \$85.00 list	20.50
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Combination tool box and running boards, 60" long	2.50
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Other parts and accessories at equally low figures	

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HEADQUARTERS  
CAR OWNERS**

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Buicks—all models. Prices right.	

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30 x 3½ Clincher Wheel.....	2.00
Electric Head Lamps—per pair.....	4.75
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Front License Brackets.....	.25
Special Ford Racing Body, complete.....	100.00
"V" shape Radiator and Stream Line Hood—complete.....	42.50

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34 x 4 Q. D. Wheels—less rings.....	1.00
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18" Steering Wheels—complete with corrugated rim.....	2.00
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Parts Repaired and Furnished  
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FORD Wheels with 30x3½  
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Dozens of others in stock. Send measurements.	
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V shaped radiators for any car. Write for quotations.	
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32x3½" with Dorian Dunlop demountable rims, set	15.00
36x3½" wheels with Stanwell Q. D. rims, each	2.50
34x4", 12-spoke wheels with Baker demountable rims, set	18.00
Wire wheels, 30x3", each	3.50
Goldberg mufflers, 16½x5½" with cut-out	2.50
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Speedster bodies, including V shaped radiator, sloping hood, dash, seats and tanks complete. For Ford cars only	70.00

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Tops for Ford roadster ..... 12.00

Touring car ..... 15.00

Complete with side curtains,

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(Dust-proof boot \$2 extra.)

\$400 1915 7-pass. bodies, fully up-  
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A few 5-pass. 1915, new..... 55.00

Ford Roadster Bodies, used, fully  
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Lighting Cable, 3-strand, 12-gauge,  
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Electric side lamps, perfect black  
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Power tire pumps for Ford cars,  
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All-steel tire savers, worth \$3.00—  
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Spicer universal joints with shaft.. 5.00

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Radiator hoods and hood support  
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\$20 6-volt storage batteries (for  
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A special lot of Stewart and Jones  
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10x14 ft., wood, easily erected.... \$ 62.50

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# The Clearing House—continued.

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**AUTO RADIATORS REPAIRED**  
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for any make of car

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Only one-third the weight of cast iron. Eliminate vibration, noise, wear and tear on bearings, and car. Higher efficiency, easier cranked, quicker pickup, more speed, less carbon. Set of FORD pistons delivered \$25 guaranteed. The greatest improvement possible for the FORD. CYLINDERS ground and fitted with Standard or Special Alloy Pistons. Oxy-Acetylene Welding.

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Either cast iron pistons and rings or our special light alloy pistons and rings furnished. State make of car in writing.

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## CYLINDER GRINDING

on automatic machinery by skilled mechanics at prices that will interest you. Gears, axles, valves and parts of all kinds made of high grade alloy steel. Send us your worn or broken parts and we will replace them.

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of cracked cylinders a specialty

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### Special Light Alloy Pistons

Our special facilities enable us to do highest grade work. Over 225 piston patterns.

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## Cylinders Rebored & Reground

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## CYLINDERS REBORED AND REGROUND

Fitted with my heat treated light weight pistons and patented three section rings.

From \$6 to \$15 per Cylinder

Ford cylinders reground, fitted with new piston rings, wrist pins and bushings for \$20.00.

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32x3	2.75	4.00	4.75
30x3½	3.00	4.50	4.50
31x3½	3.00	4.50	4.75
32x3½	3.00	4.50	4.75
34x3½	3.25	4.75	37x4½
36x3½	3.50	5.00	38x4½
30x4	3.50	5.00	40x4½
31x4	3.75	5.25	42x4½
32x4	3.75	5.25	35x5
33x4	4.00	5.50	36x5
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on your next

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by using our

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32x3½	6.00	34x4½	9.00
34x3½	7.00	35x4½	9.00
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31x3½.....	7.25	2.20	34x4½.....	12.00	4.00
32x3½.....	7.50	2.25	35x4½.....	12.50	4.10
34x3½.....	8.00	2.35	36x4½.....	13.50	4.15
30x4.....	8.50	2.85	37x4½.....	14.00	4.25
31x4.....	8.75	2.95	36x5.....	15.00	4.95
32x4.....	8.50	3.05	37x5.....	16.00	5.05
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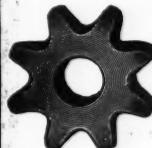
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No Better Units Built

We ask the opportunity to prove our statements. Wire or write for catalog and complete information.

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by the

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*"The Speedometer of Absolute Accuracy"*

Make it a part of your equipment. Investigate the Corbin-Brown today — the one speedometer that can stand investigation.

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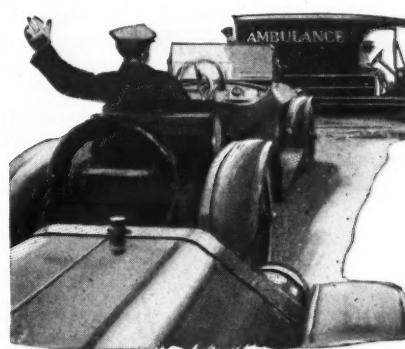
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NEW BRITAIN, CONN.

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Brakes never fail when lined with

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in the Motor Vehicle Section of the  
Panama-Pacific International  
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of HONOR were both awarded to the*

*Packard*

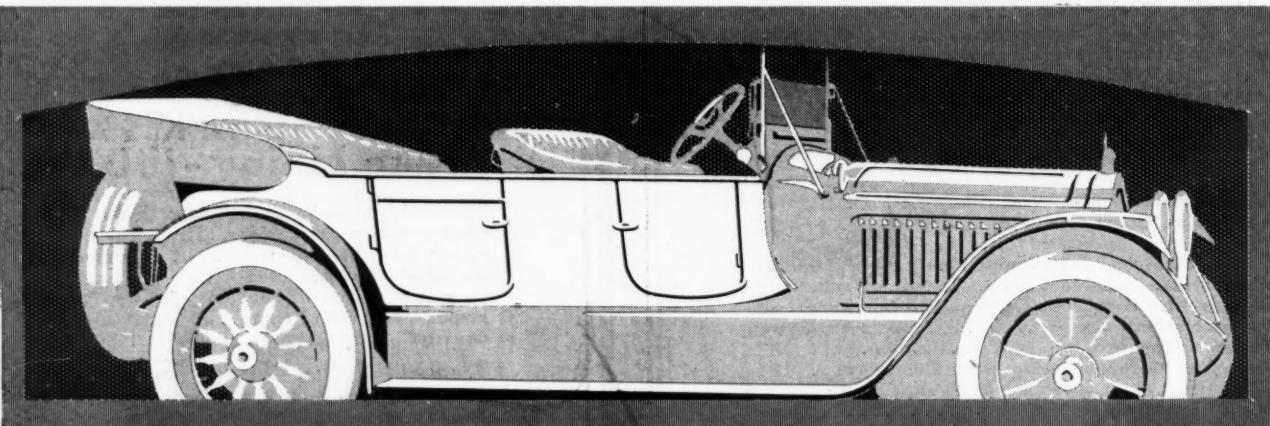
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*"Ask the man who owns one*



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